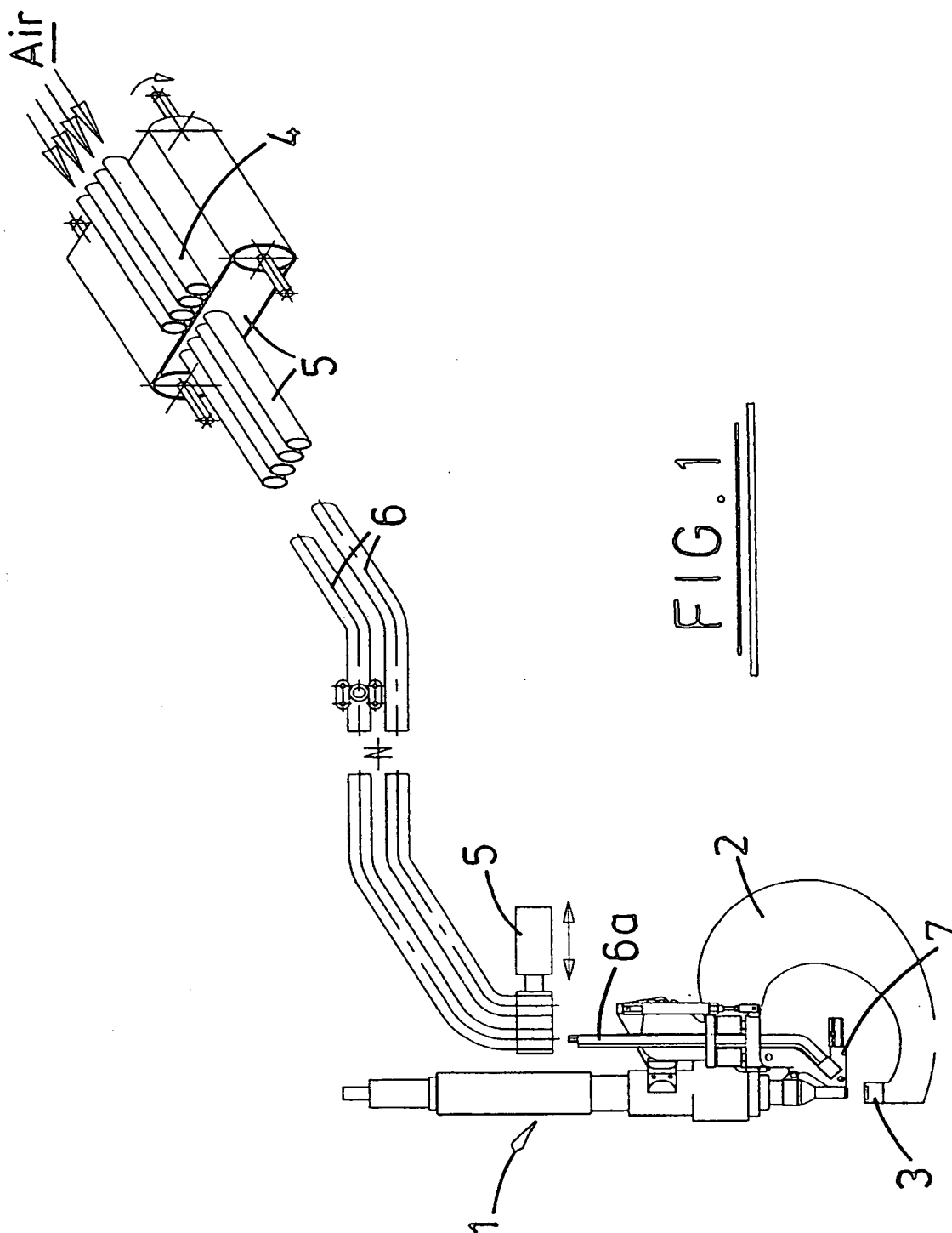


1-57



2-57

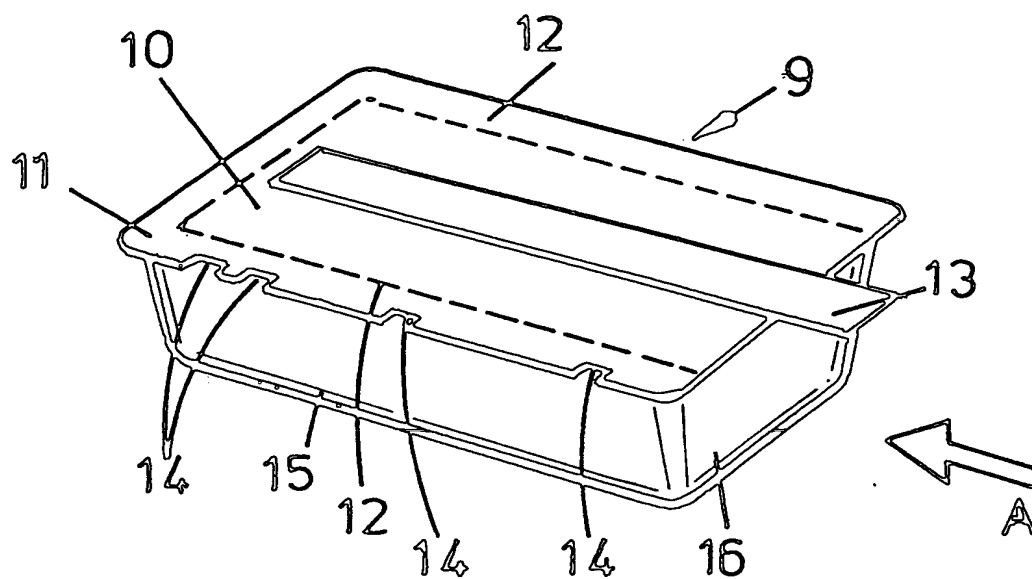


FIG. 2

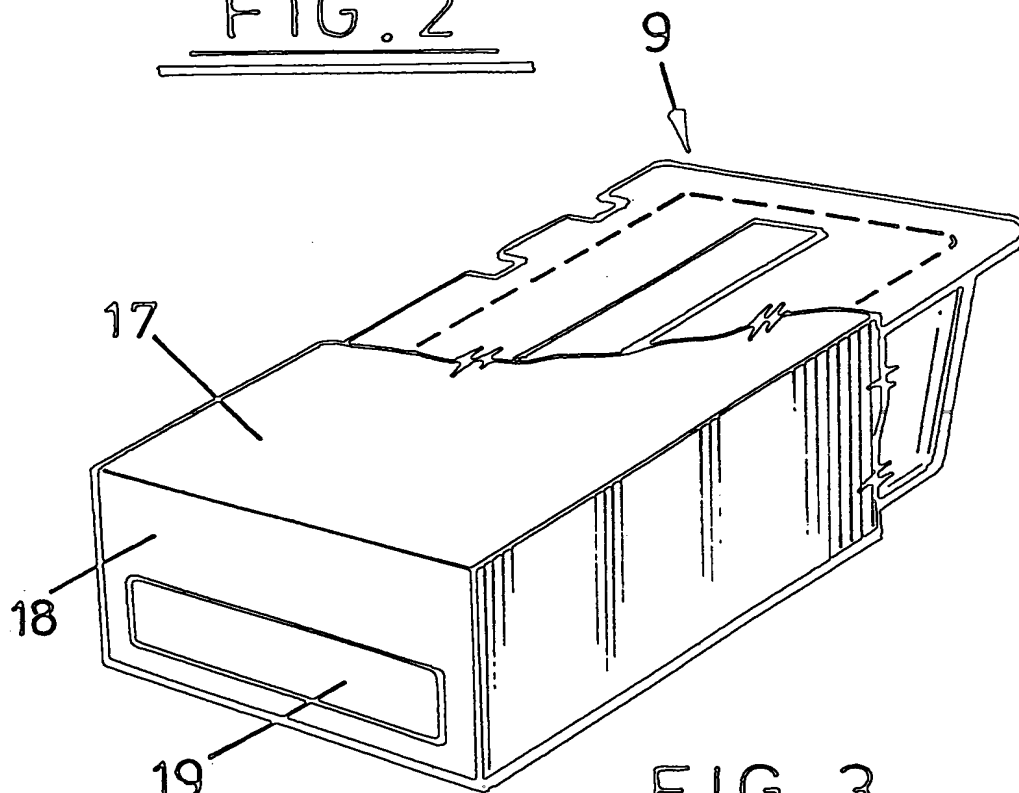


FIG. 3

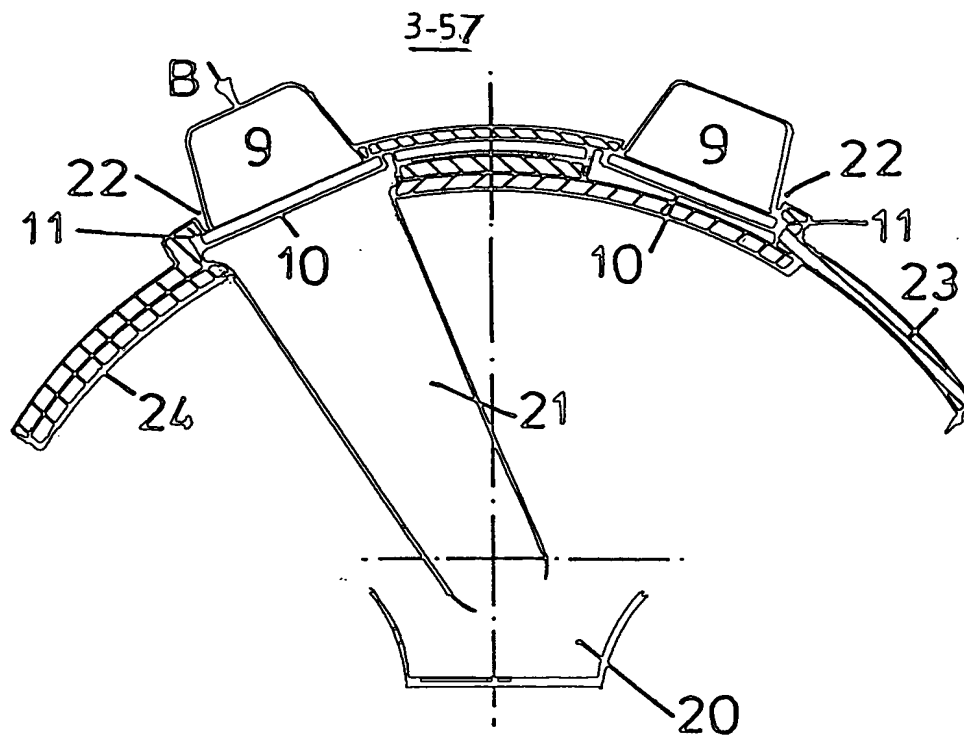


FIG. 4

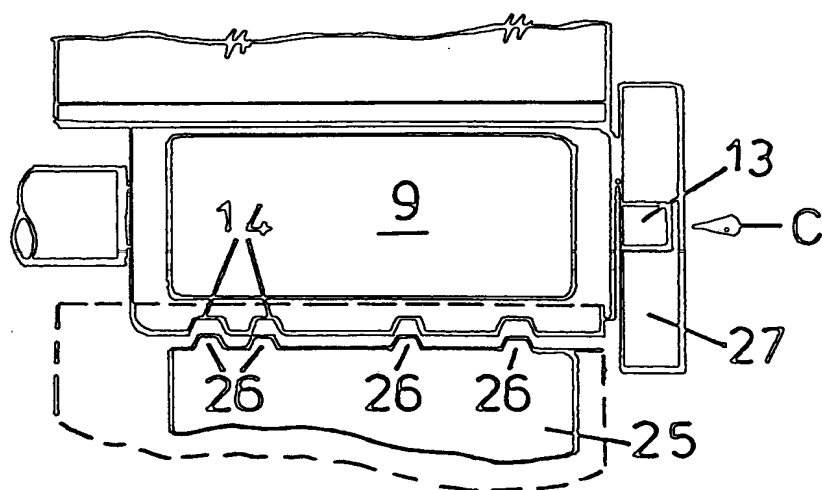


FIG. 5

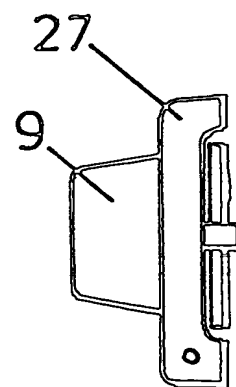
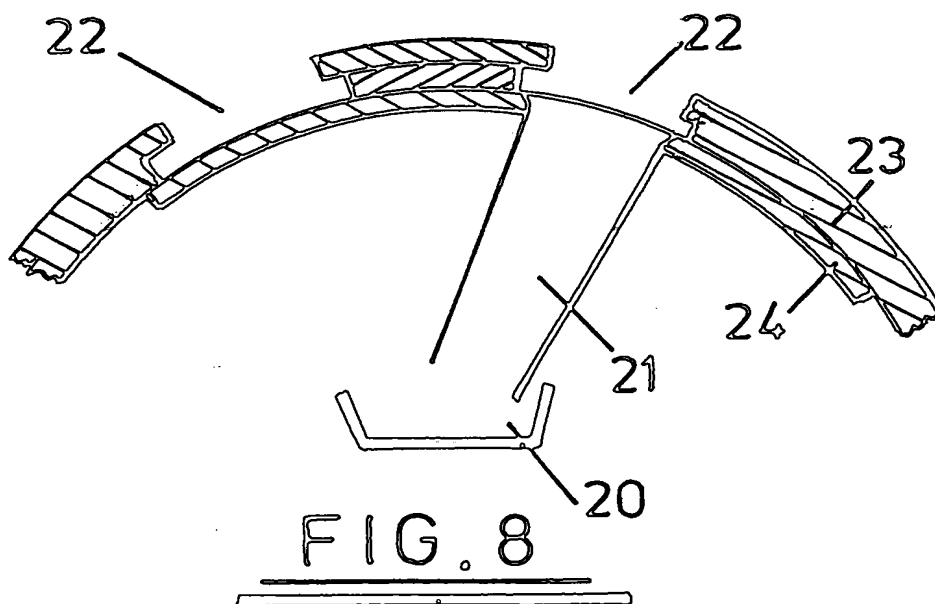
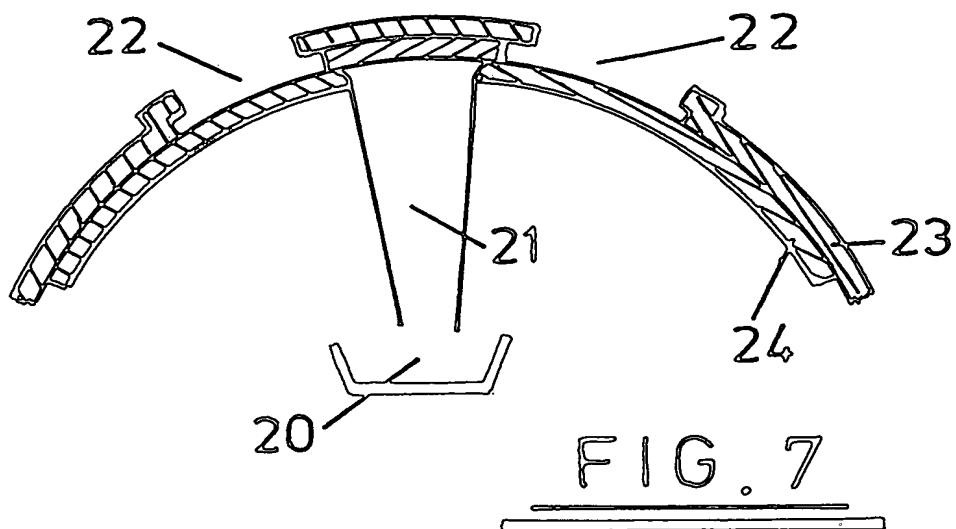


FIG. 6

4-57



5-57

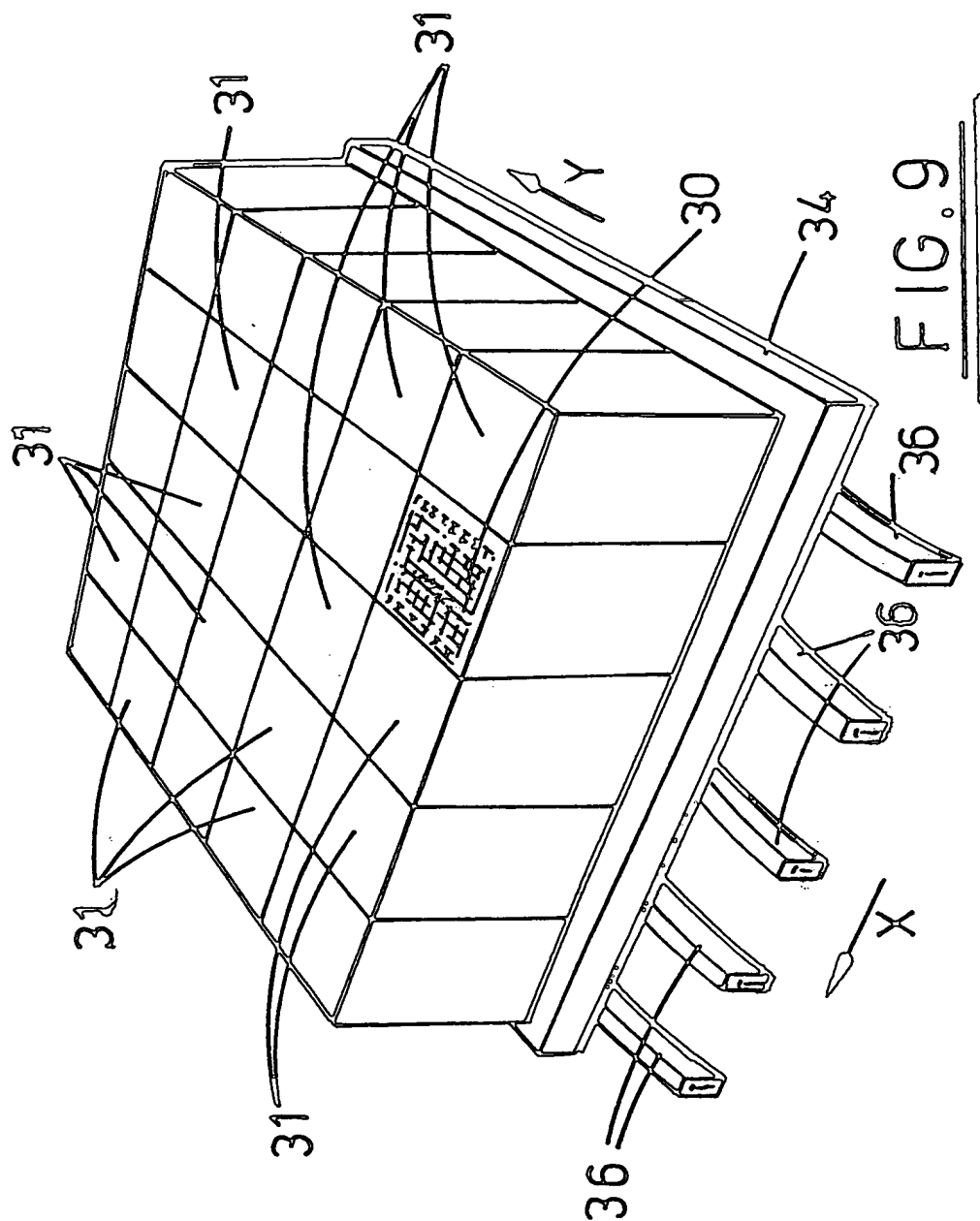
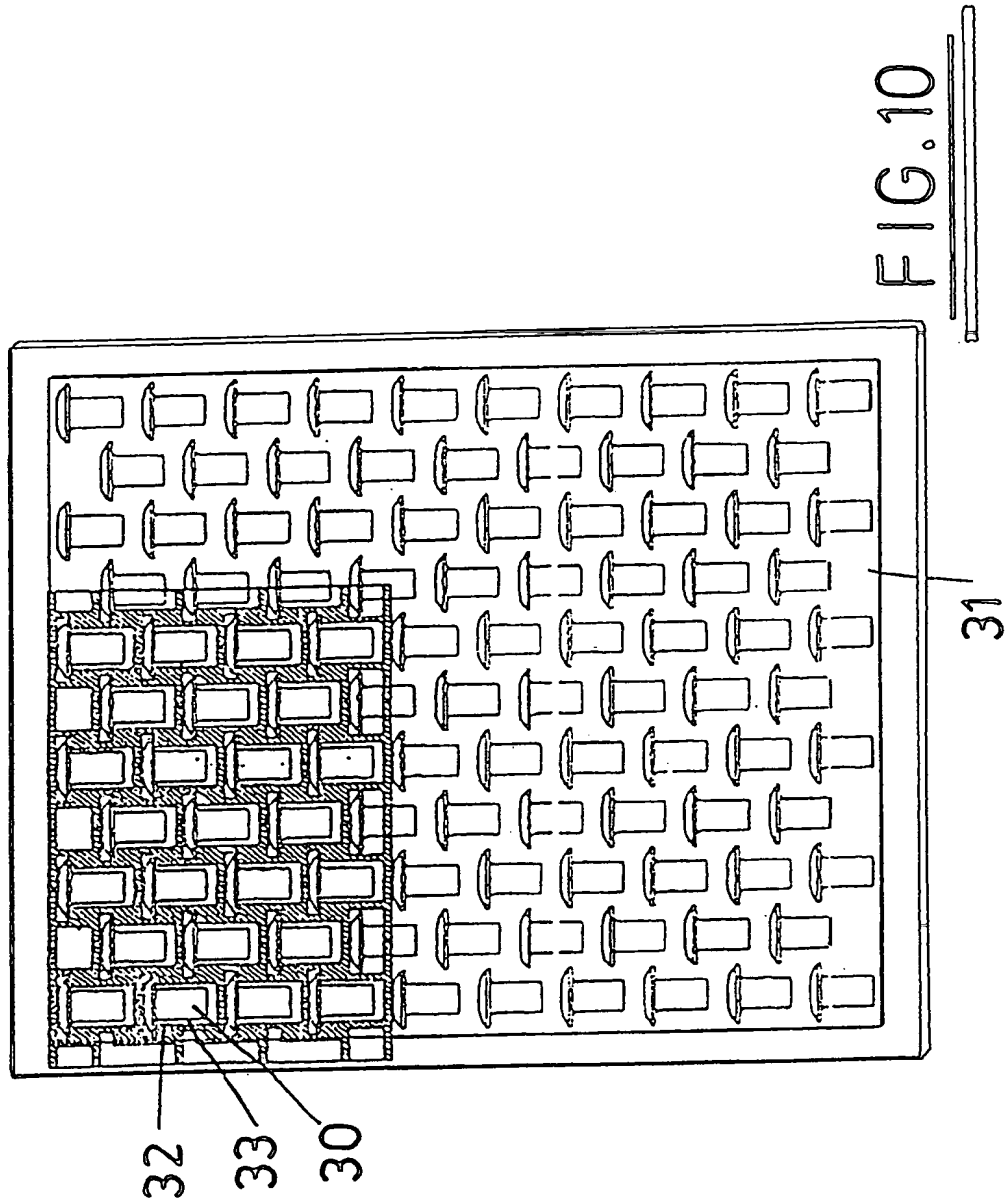
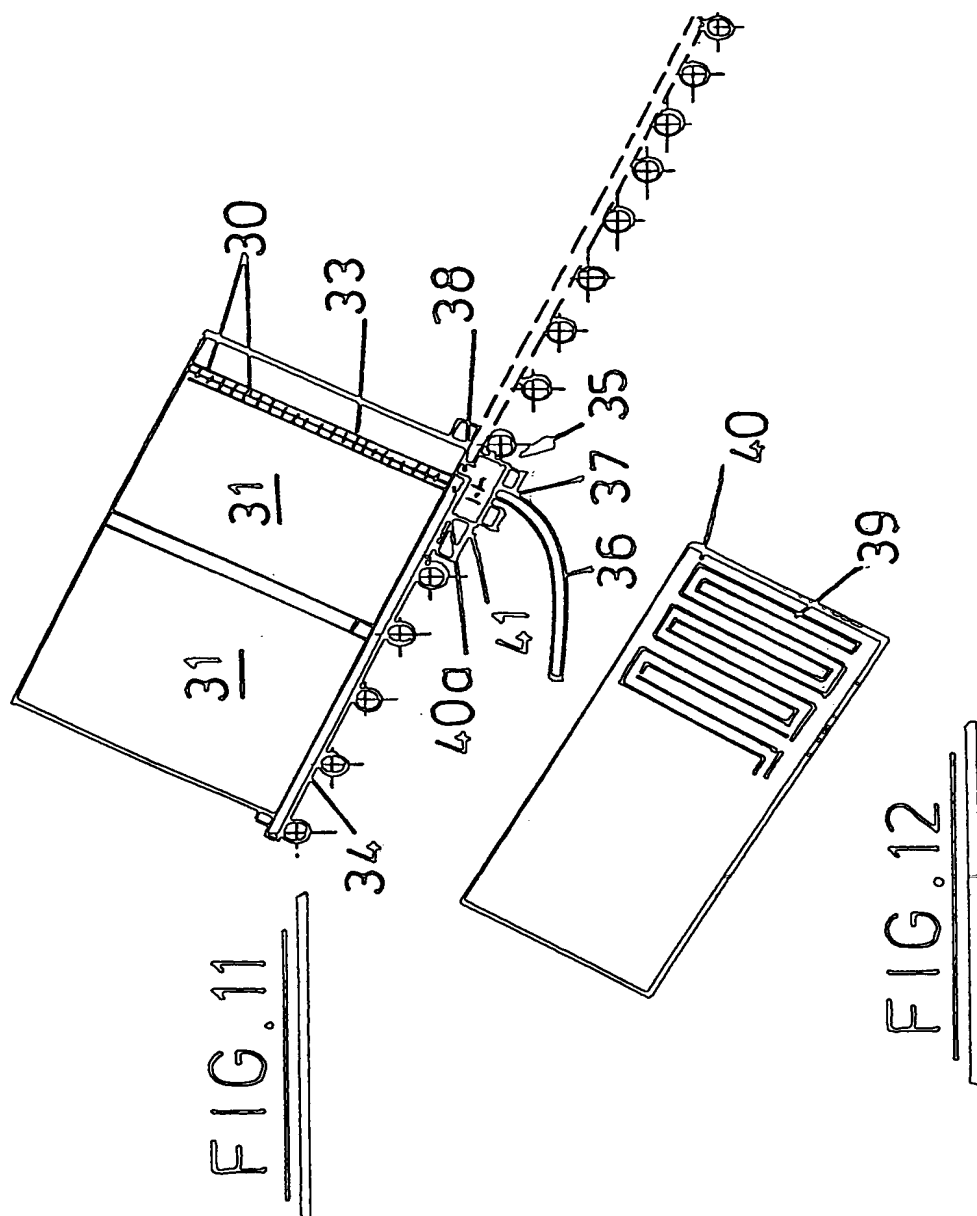


FIG. 9

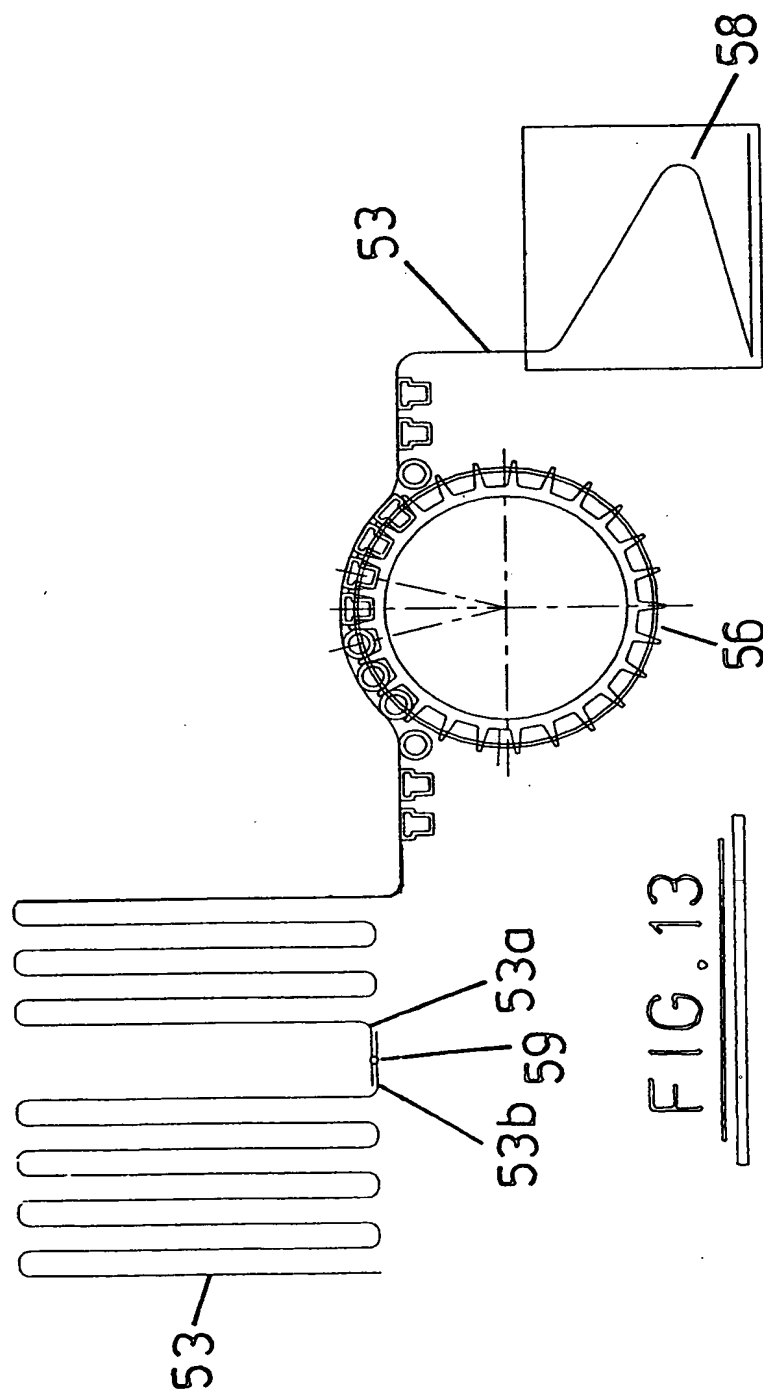
6-57



7-57



8-57



9-57

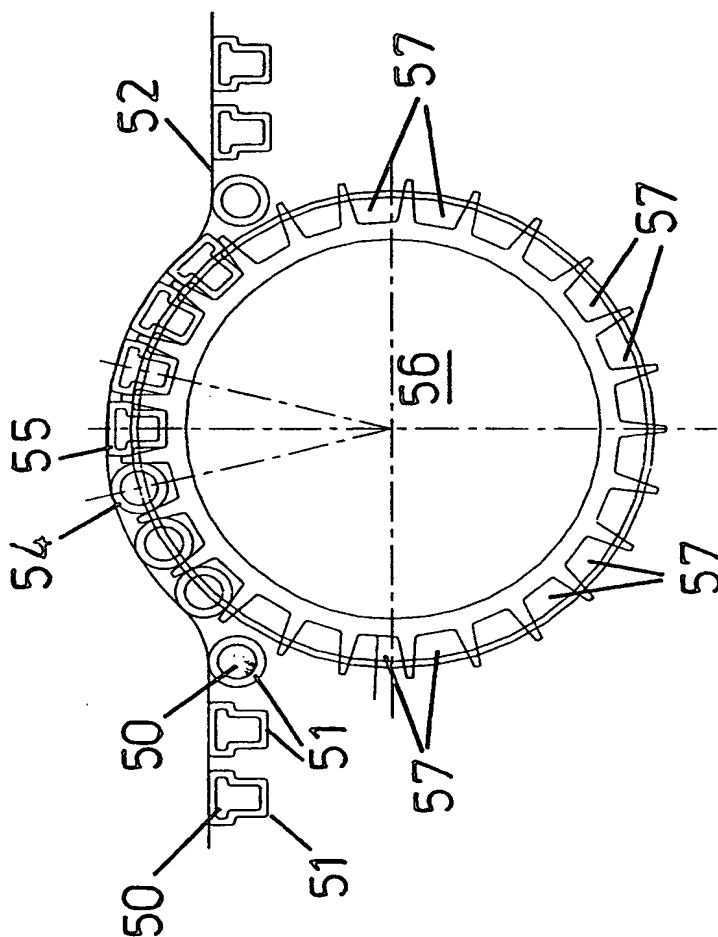
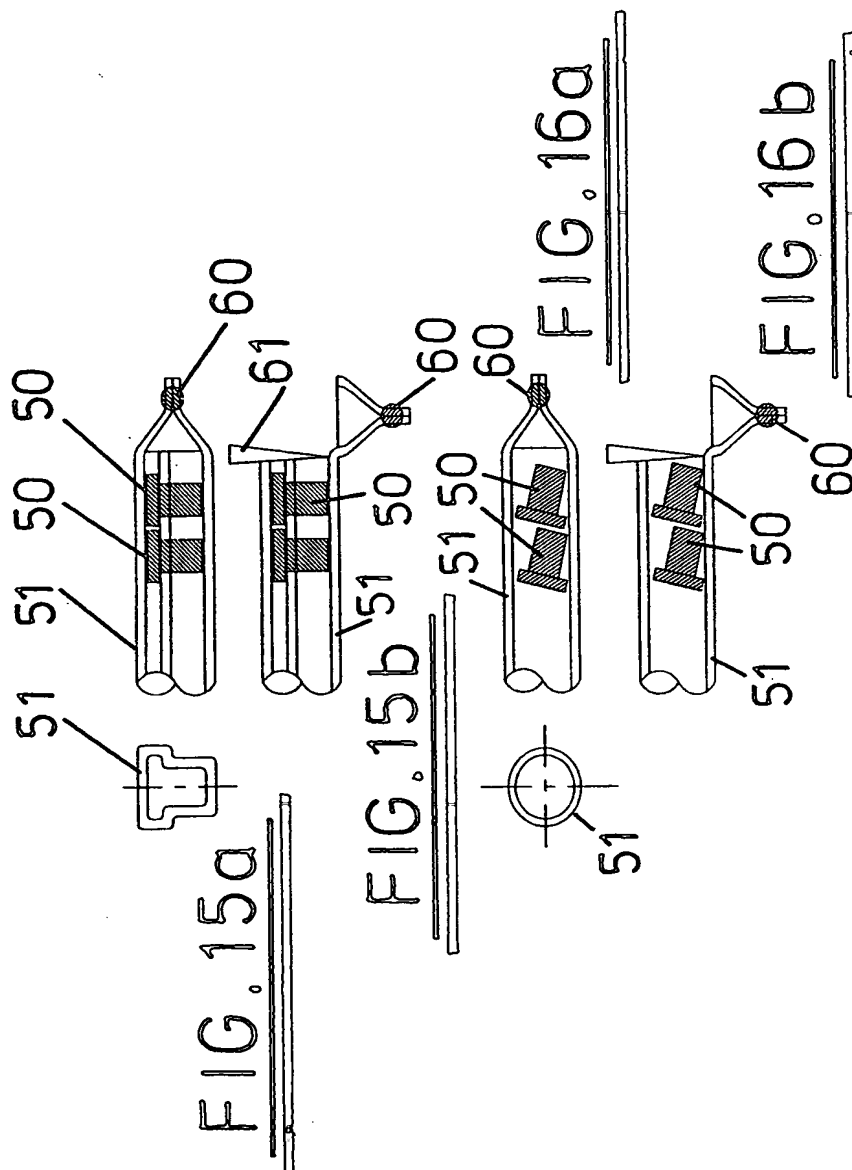
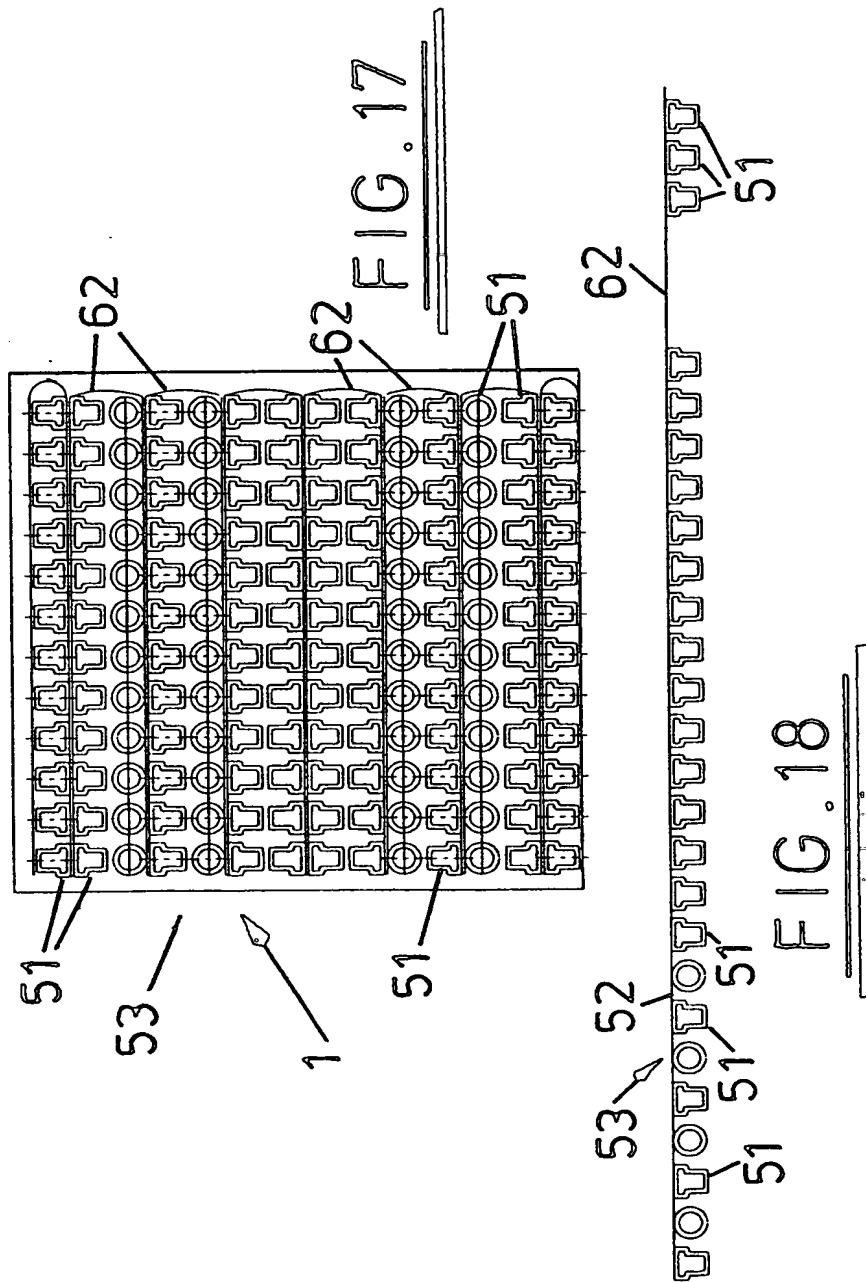


FIG. 14

10-57



11-57



12-57

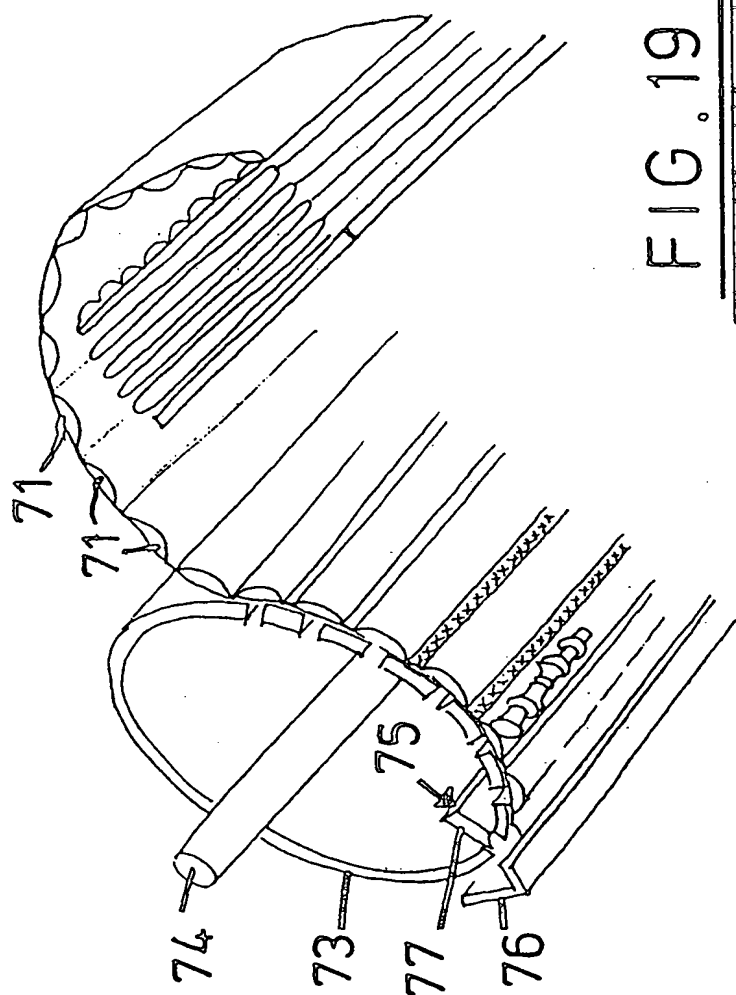


FIG. 19

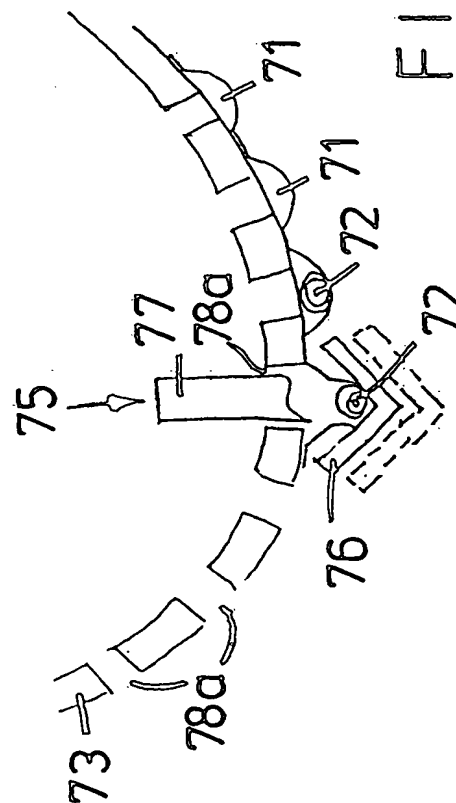
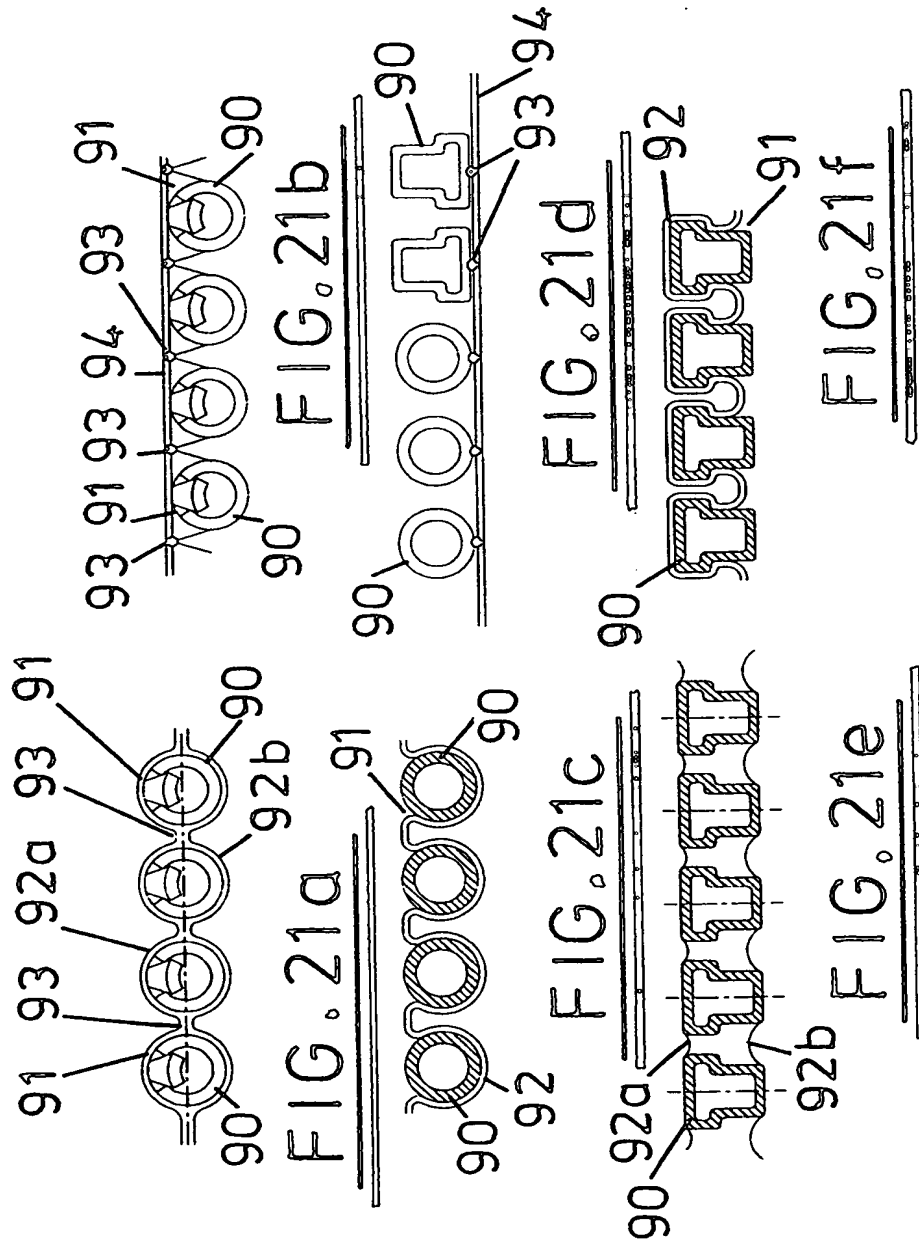
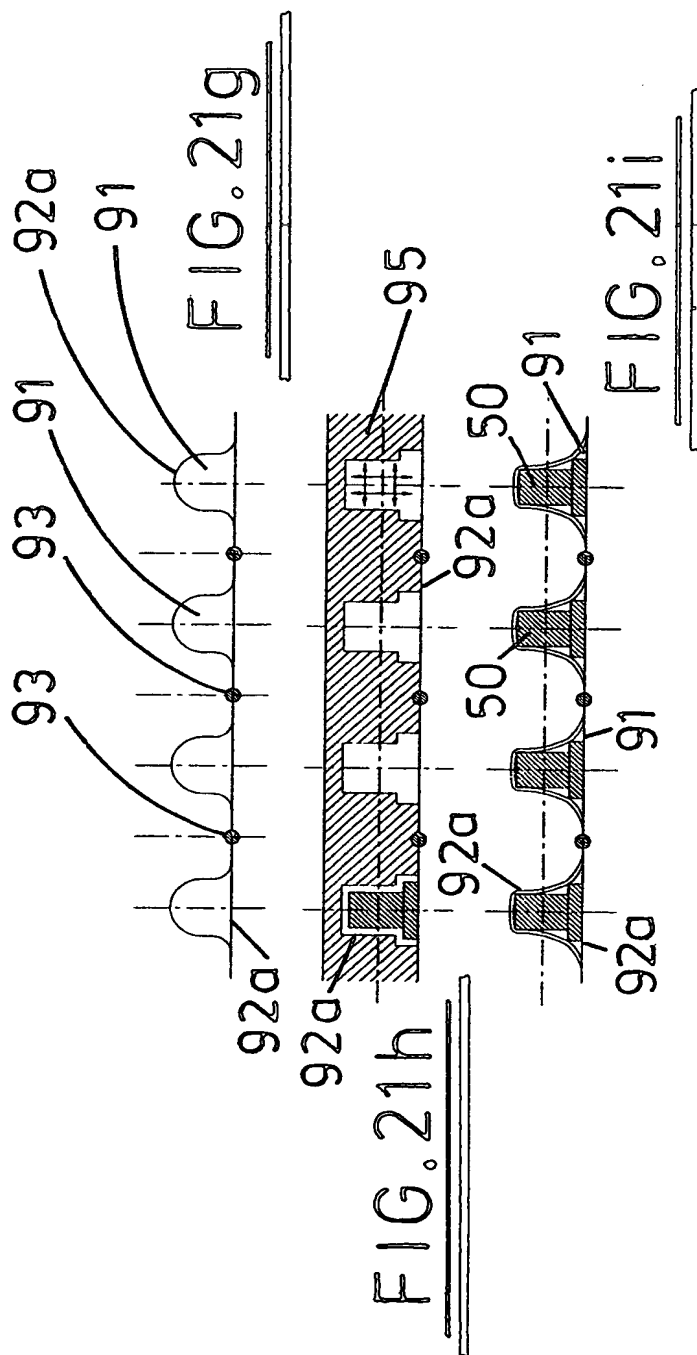
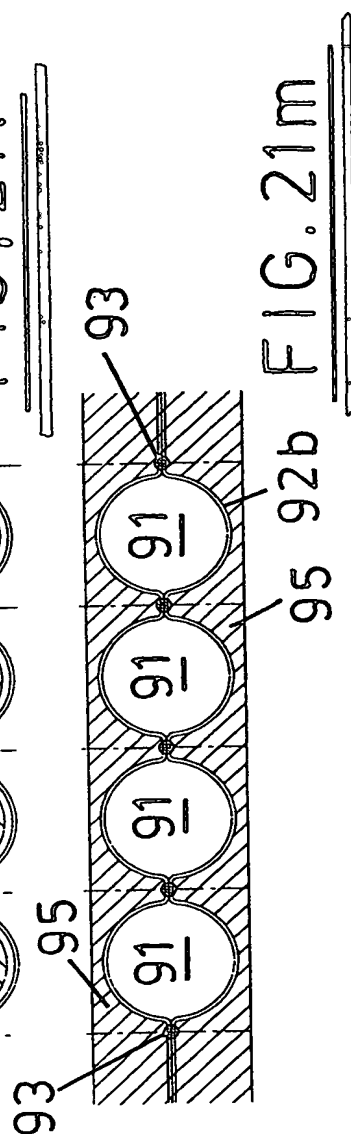
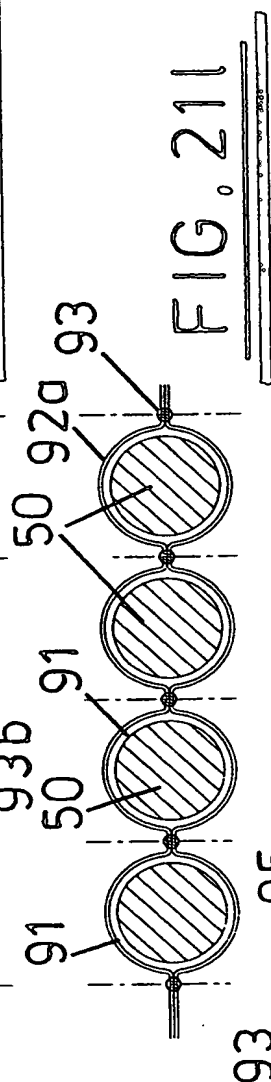
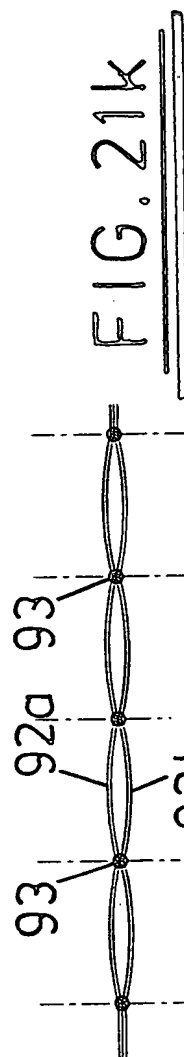
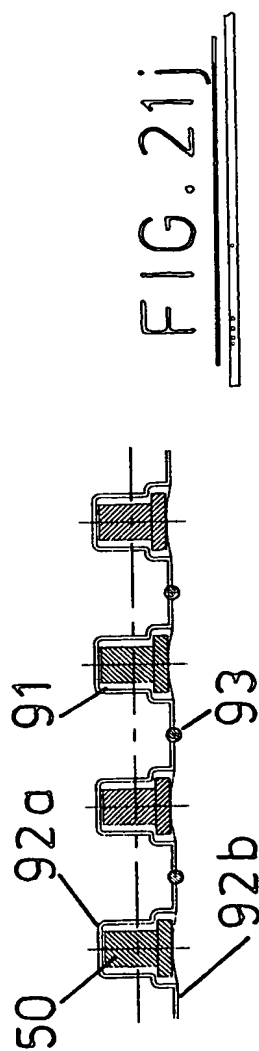


FIG. 20

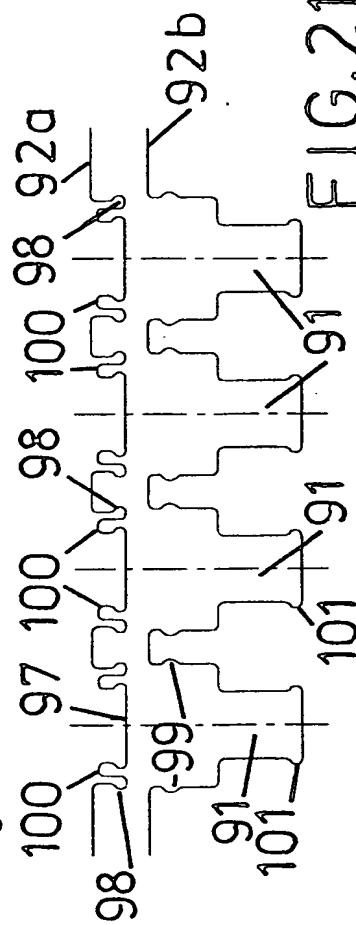
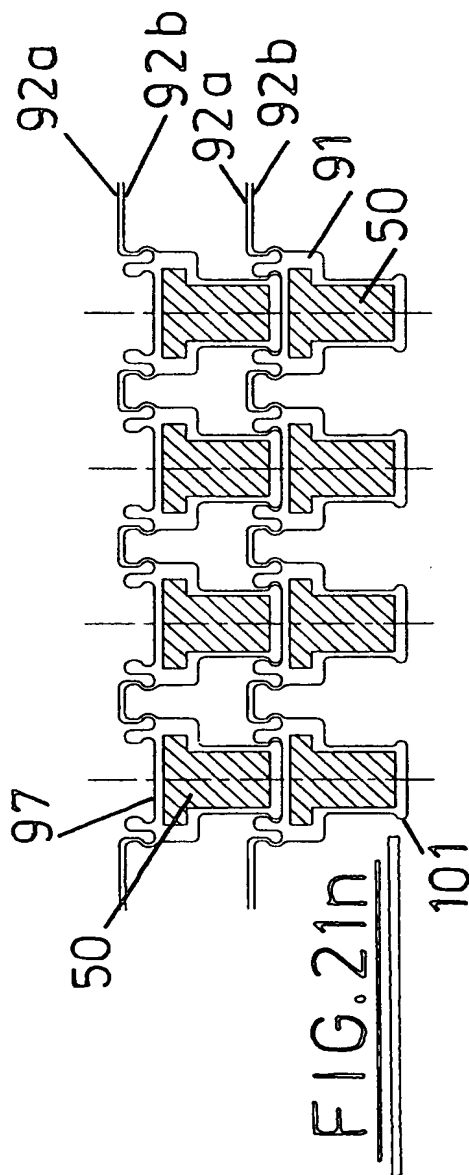


14-57

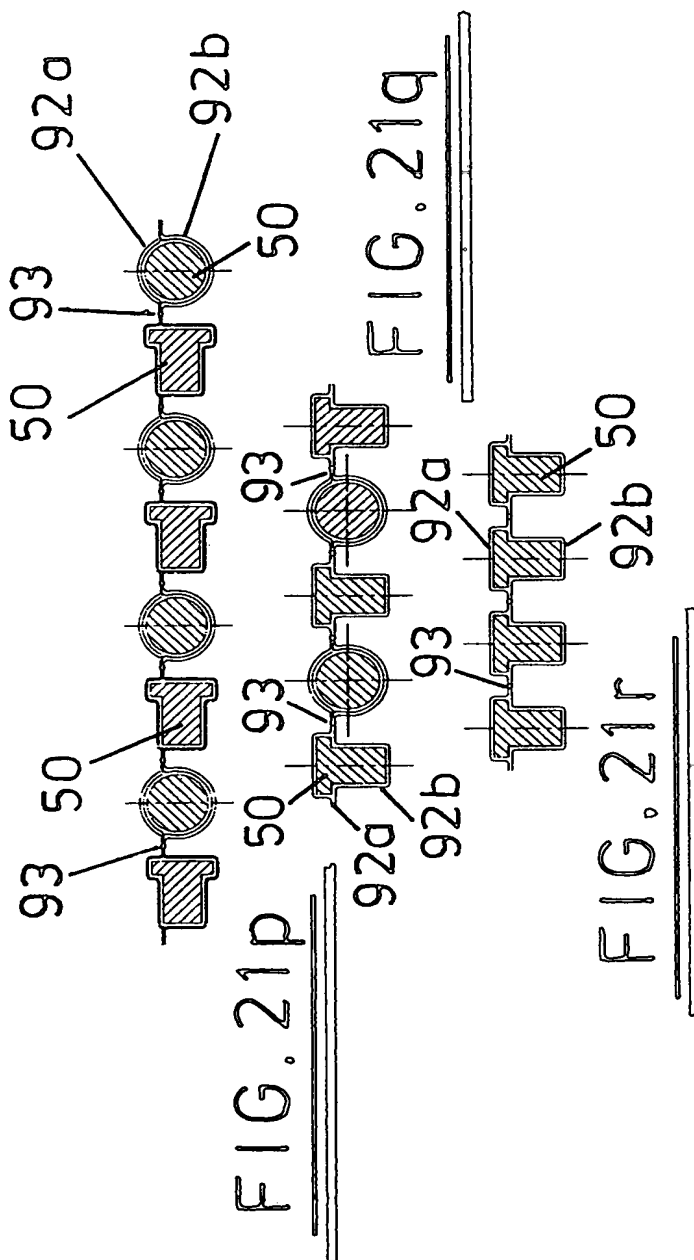


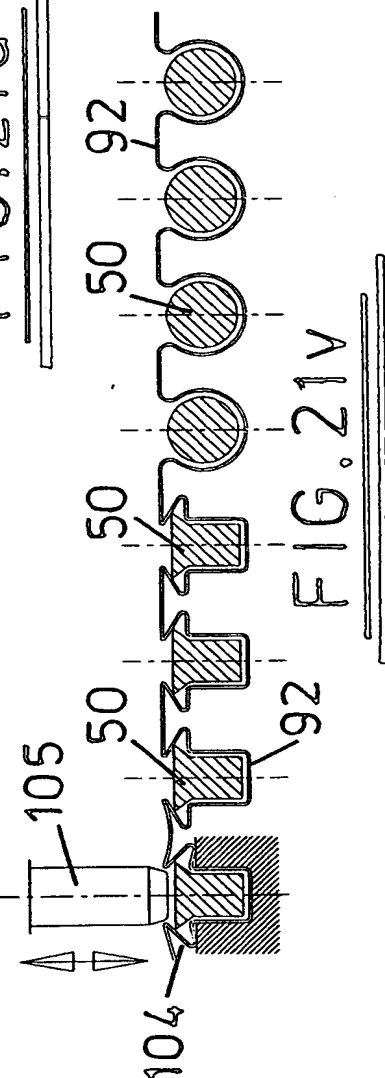
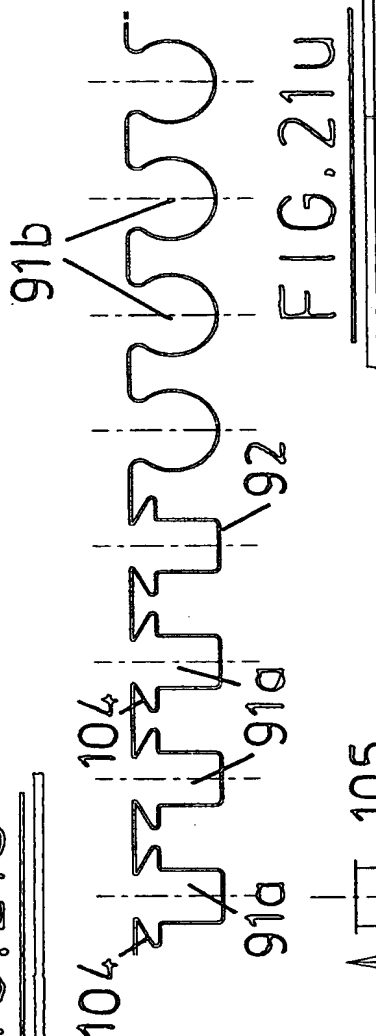
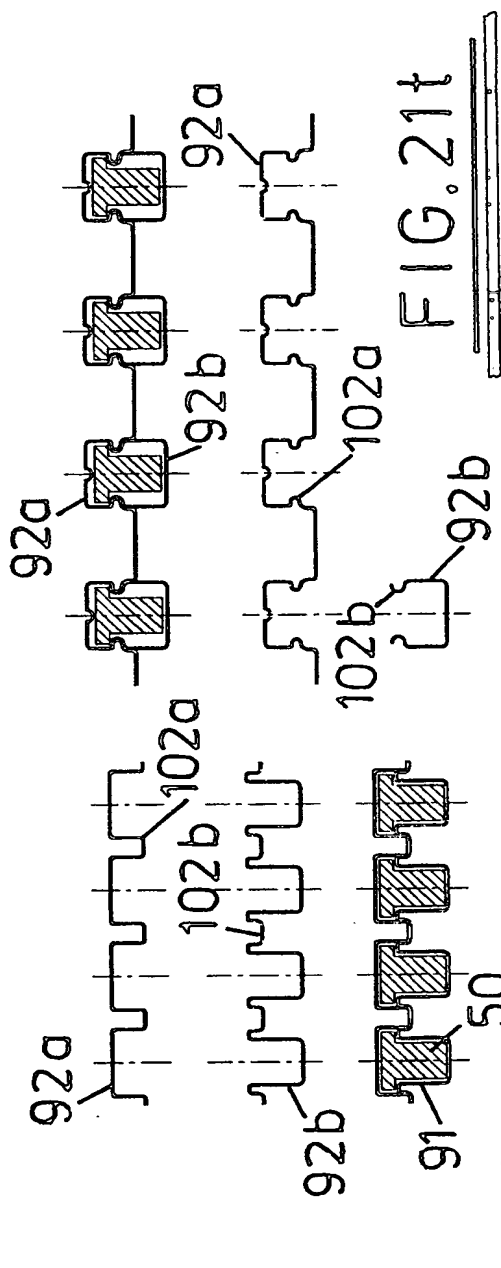


16-57

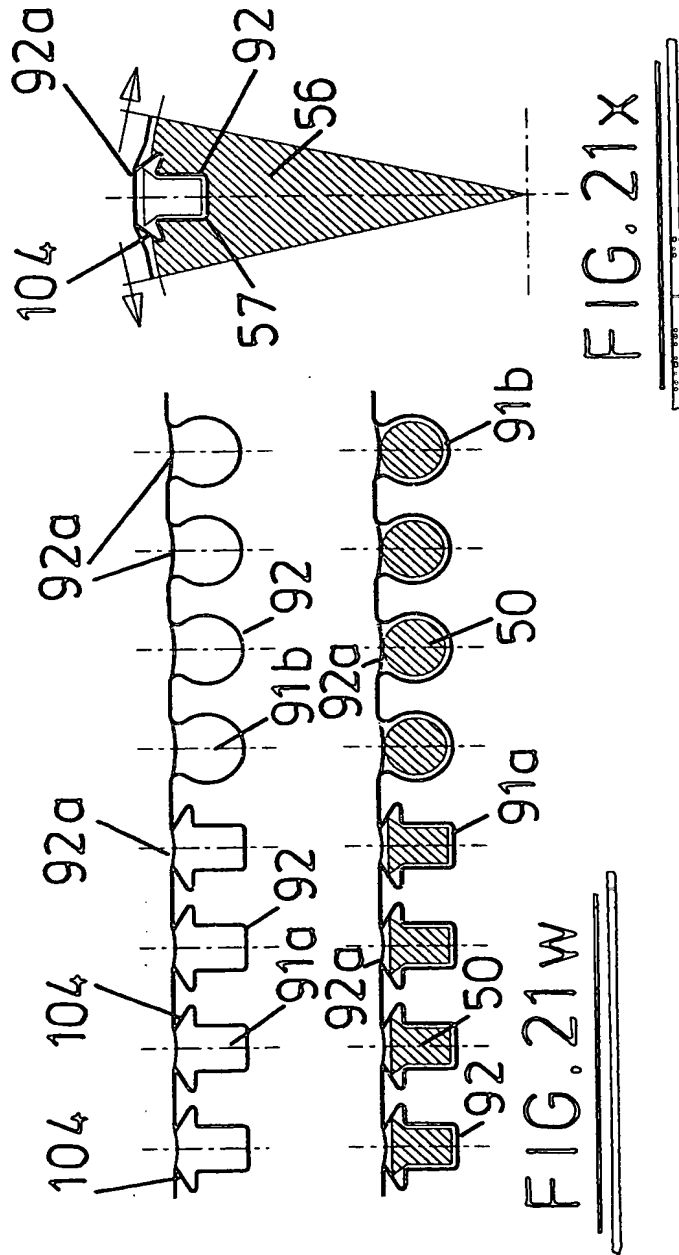


17-57

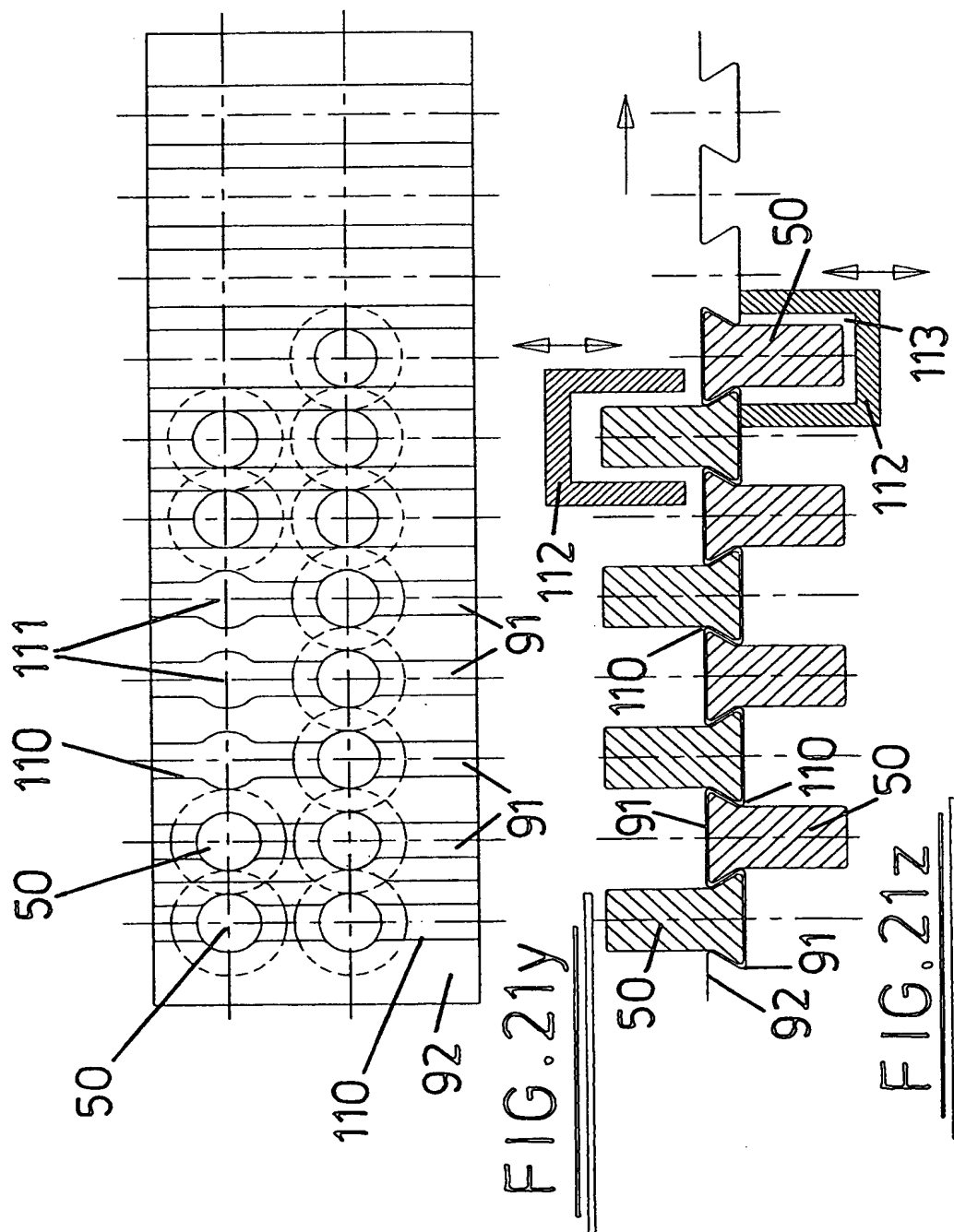




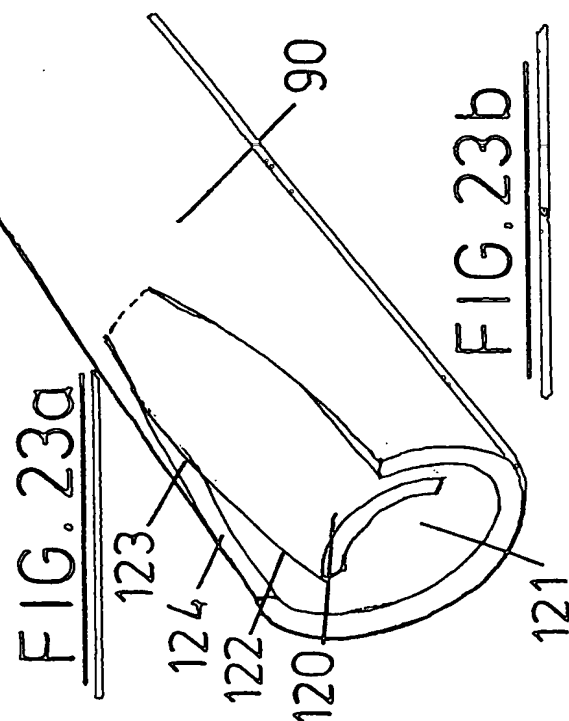
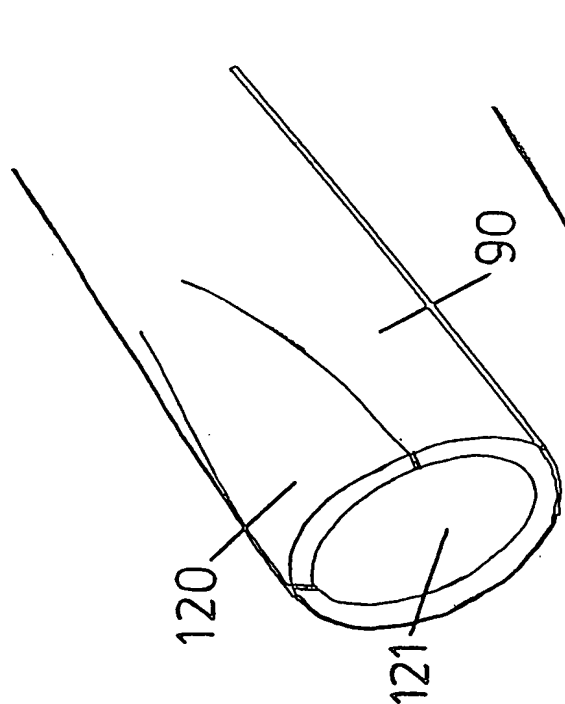
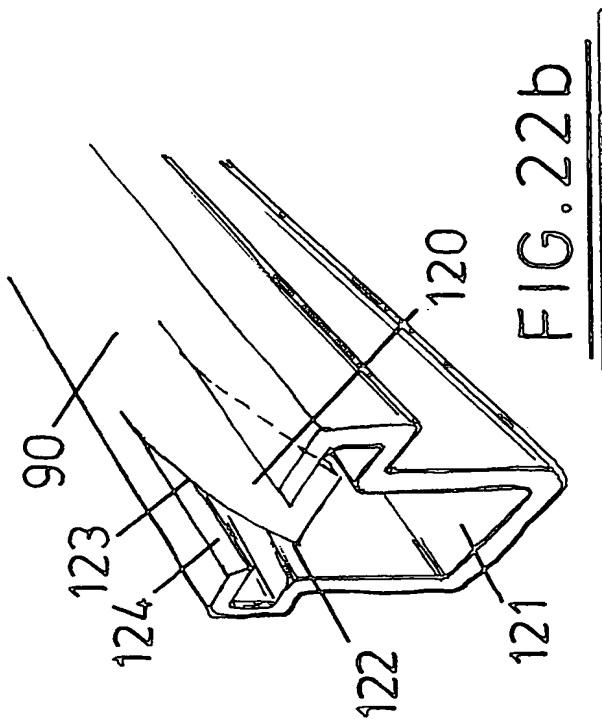
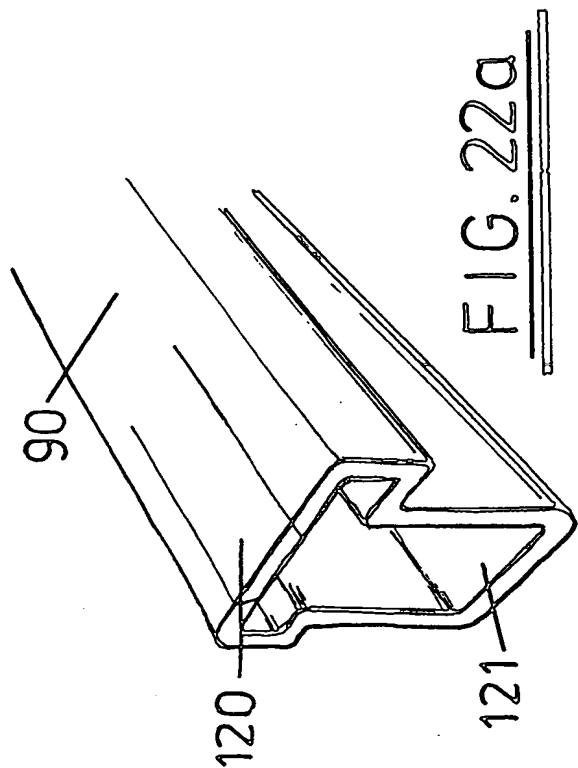
19-57



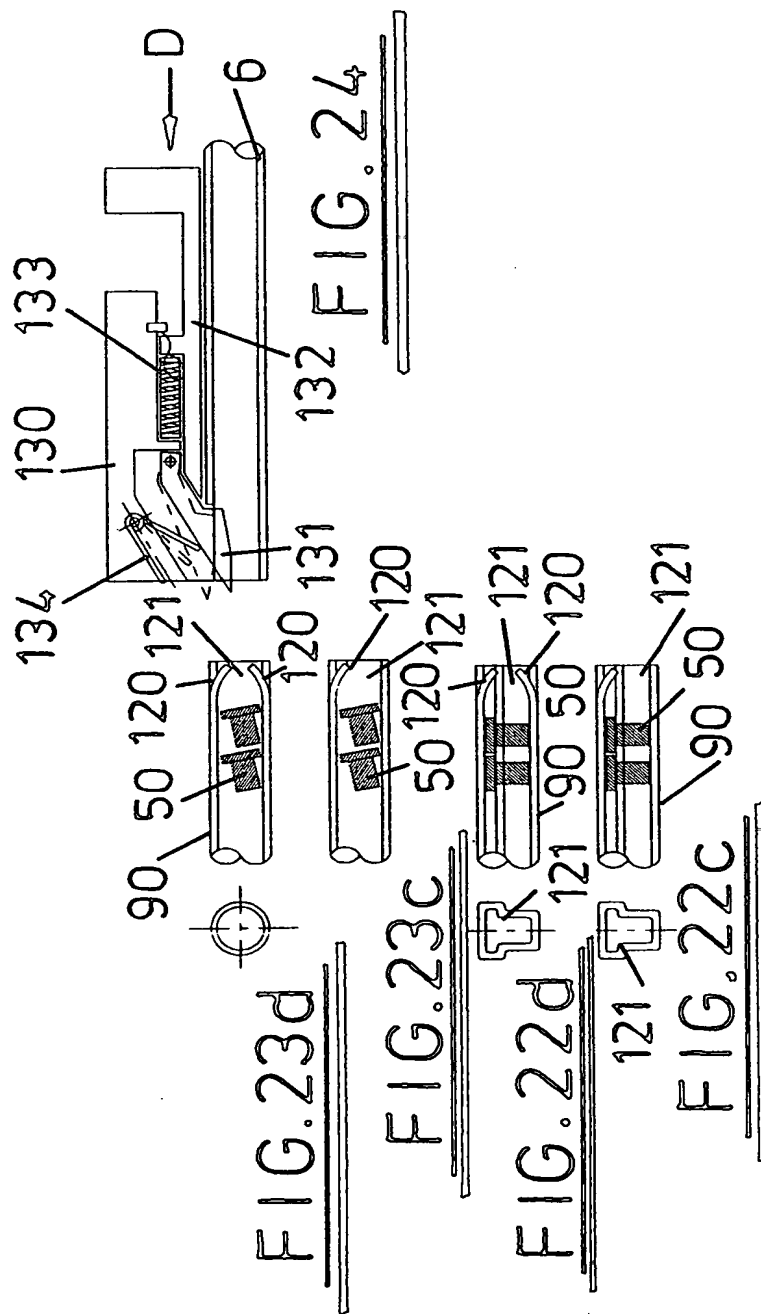
20-57



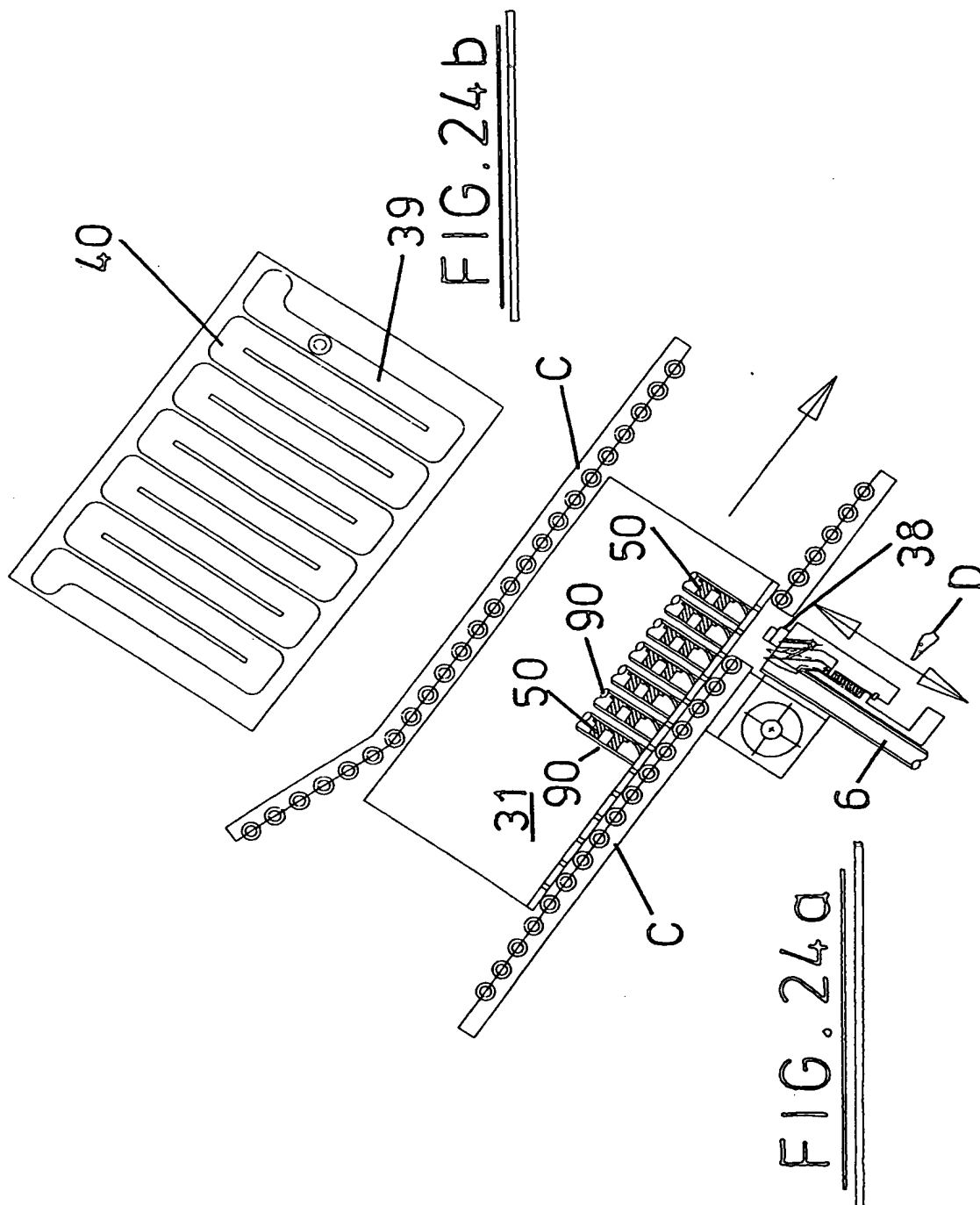
21-57



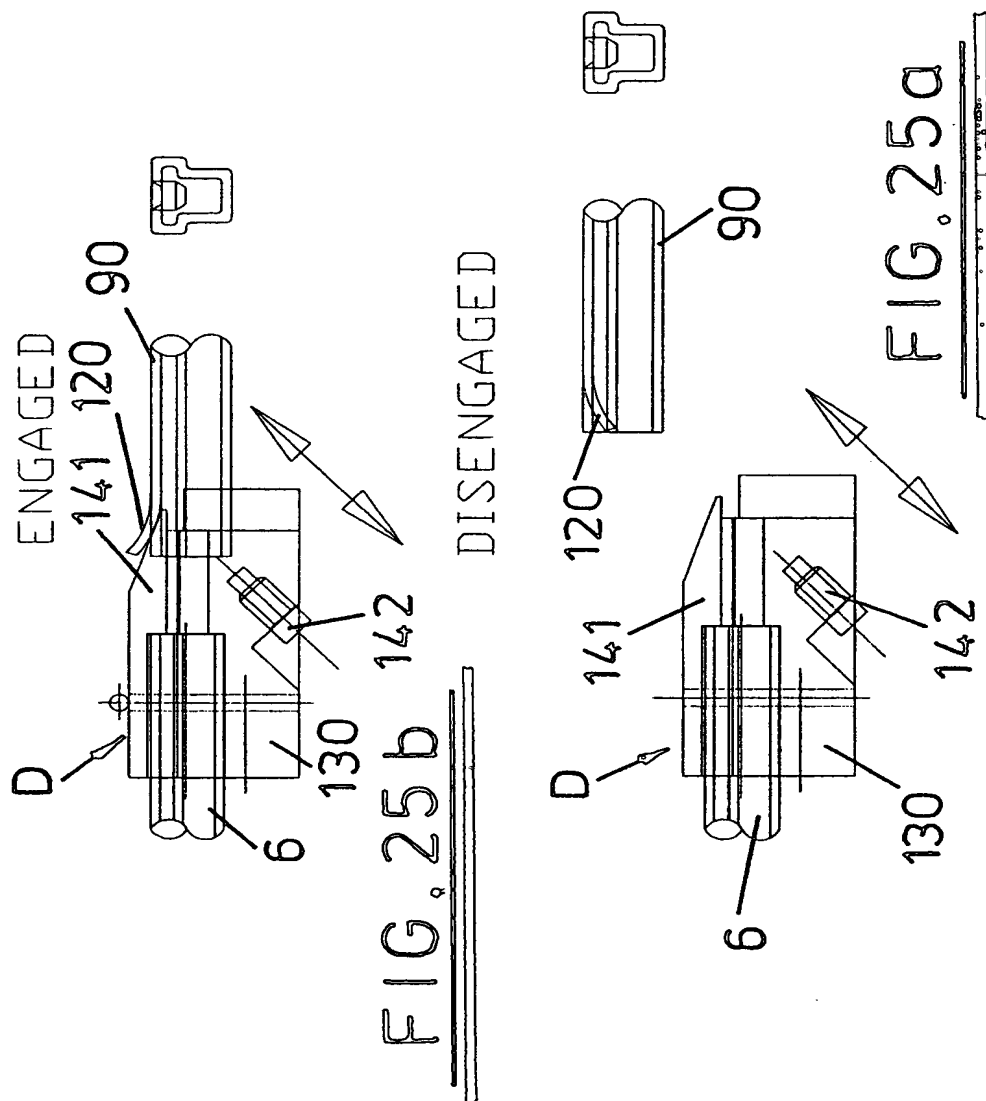
22-57

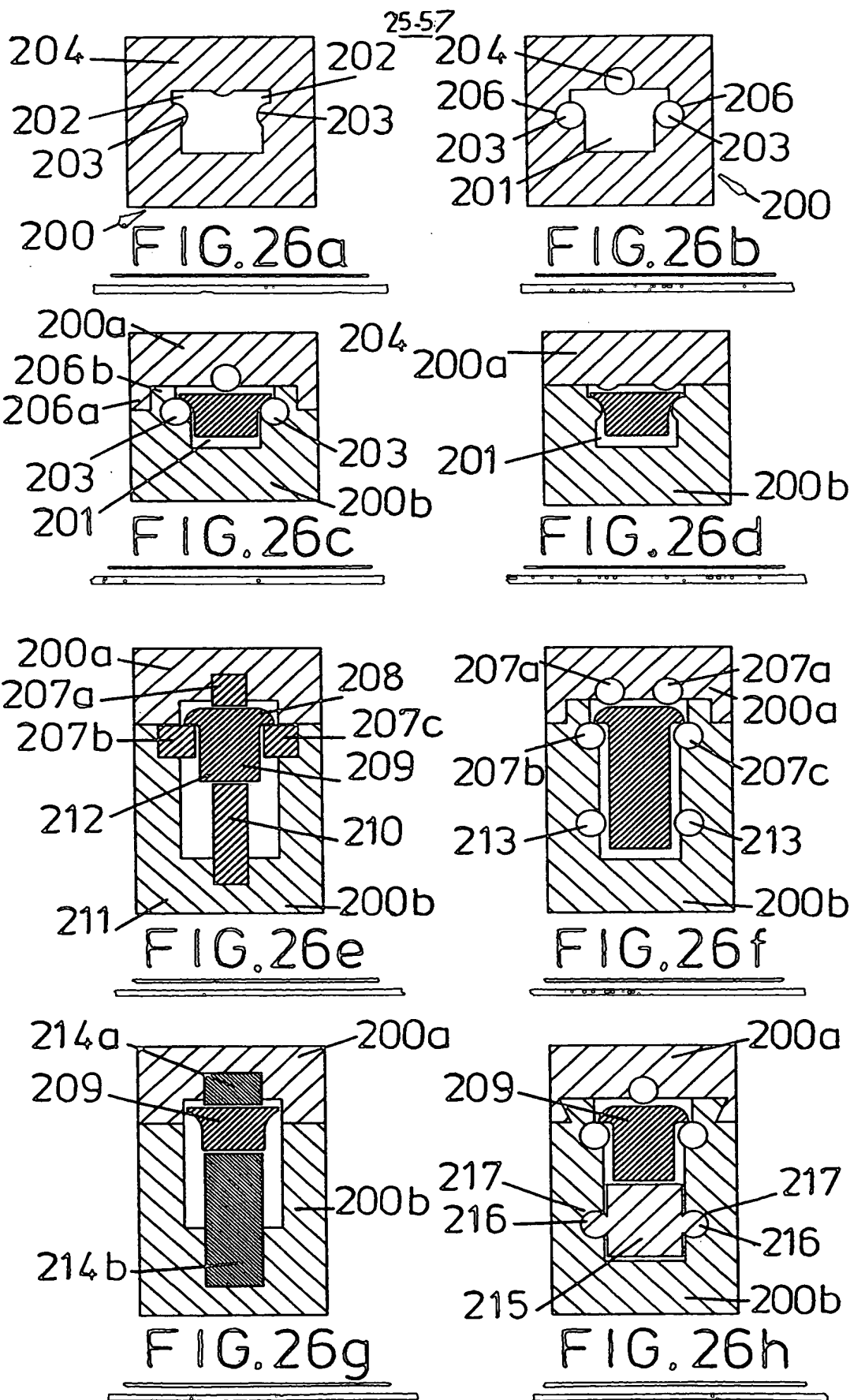


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26-57

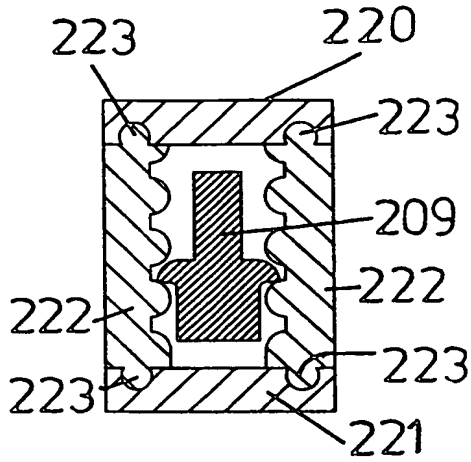


FIG. 26i

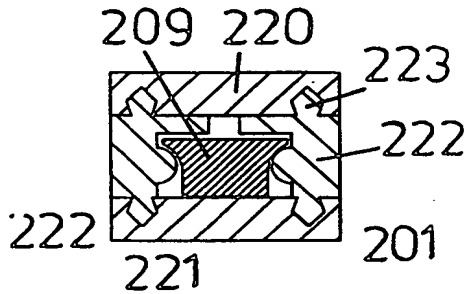


FIG. 26k

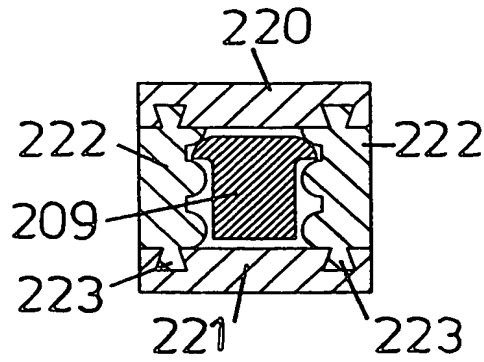


FIG. 26j

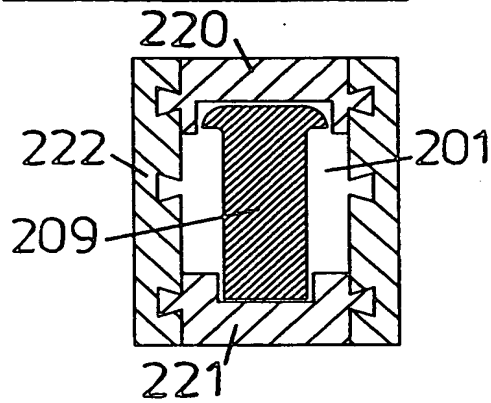


FIG. 26l

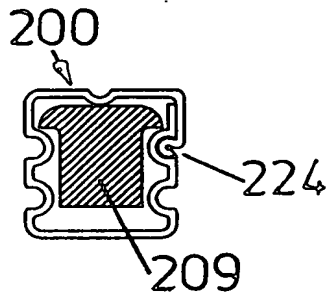


FIG. 26m

27-57

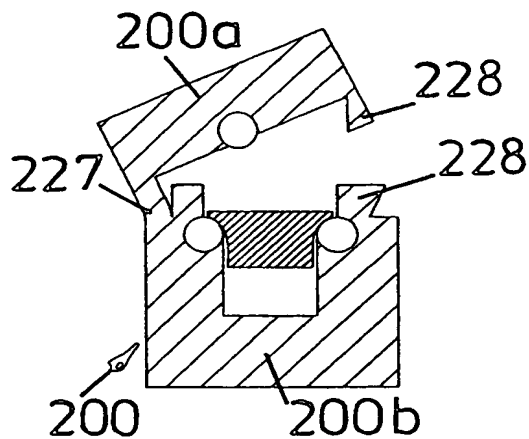


FIG. 26n

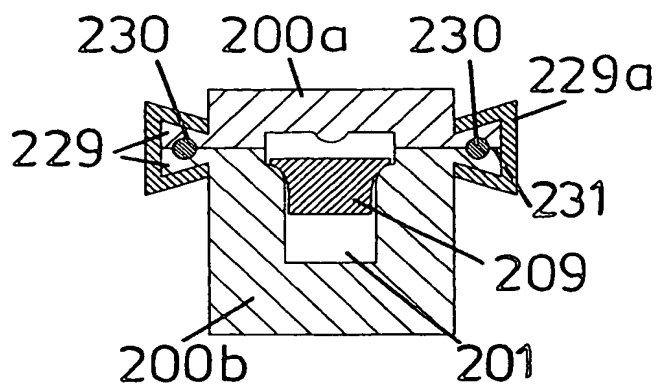


FIG. 26o

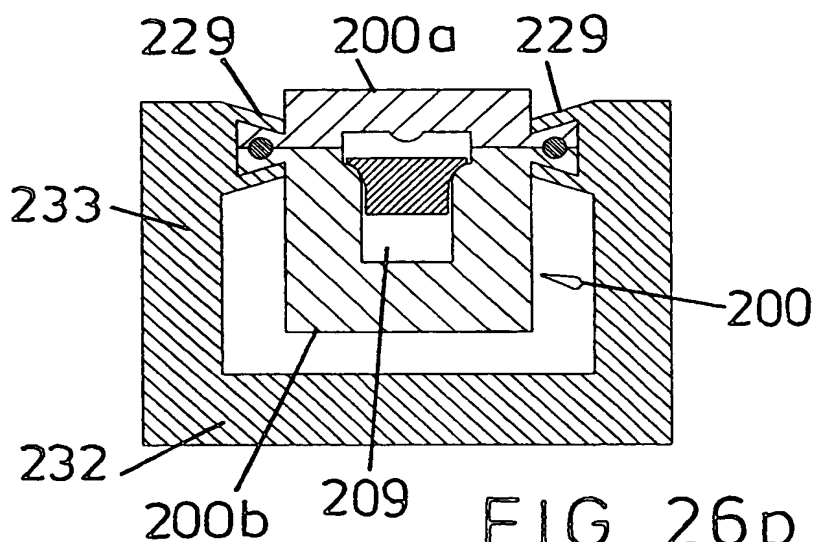


FIG. 26p

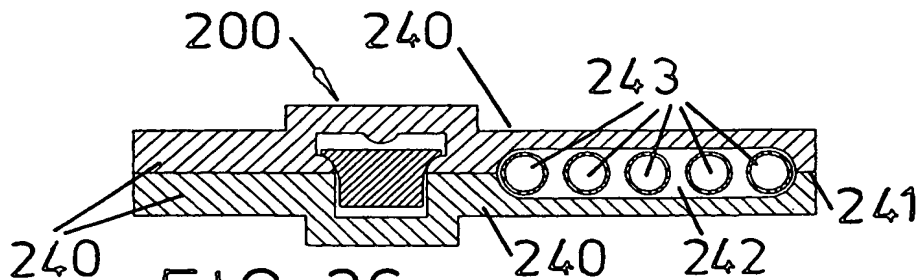


FIG. 26q

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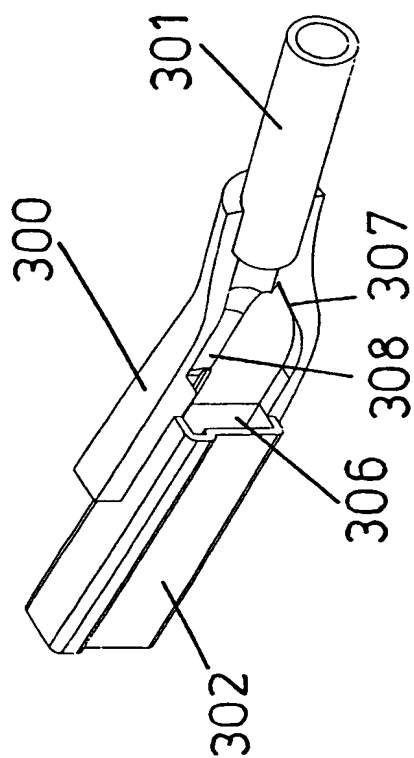


FIG. 27a

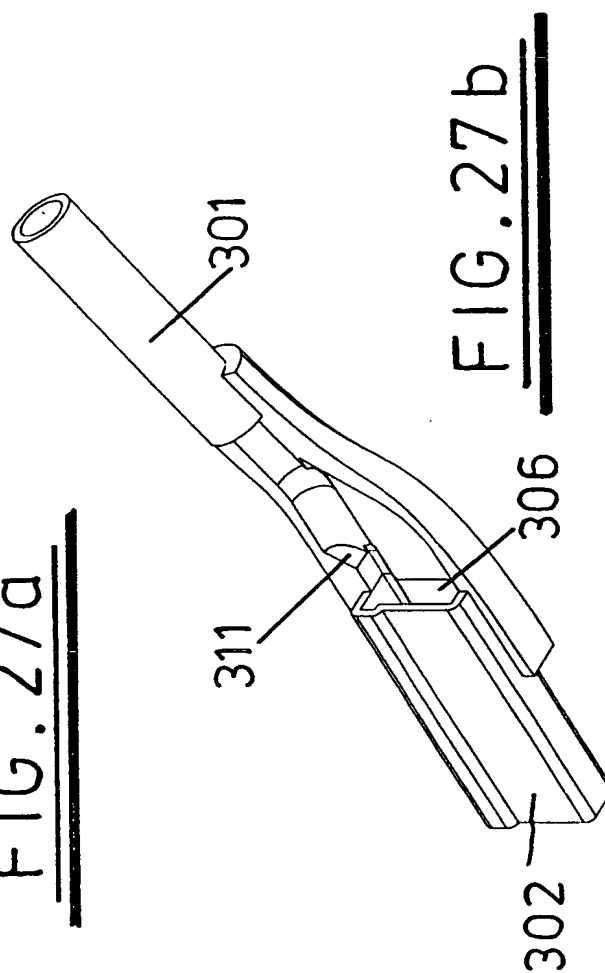
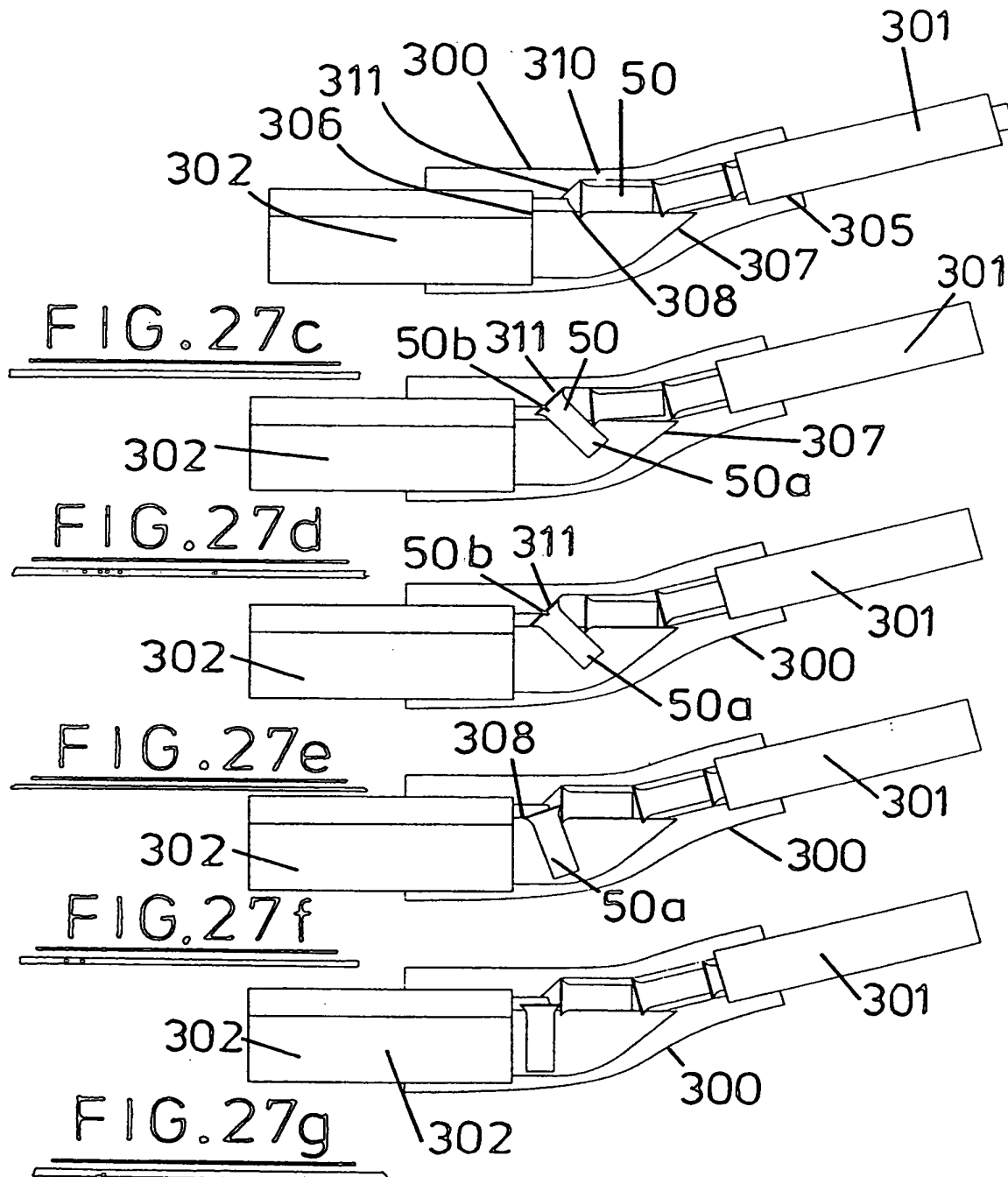


FIG. 27b

29-57



30-57

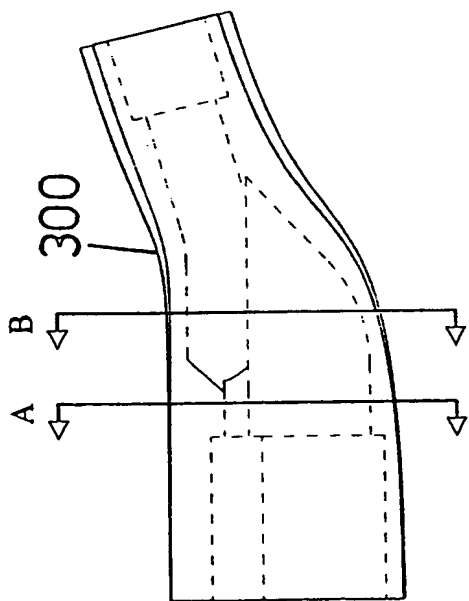


FIG. 27h

Air

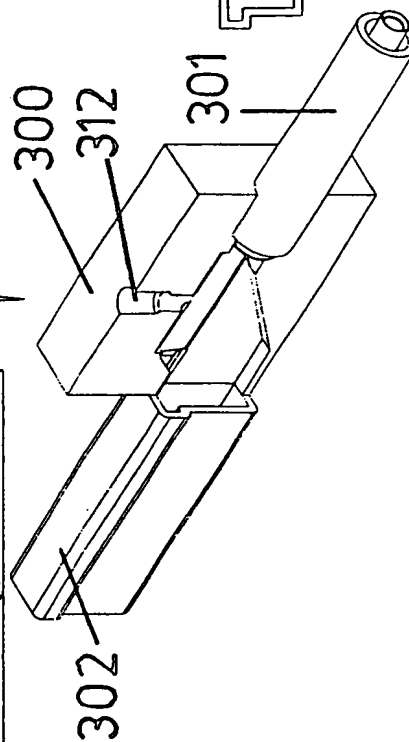


FIG. 27j

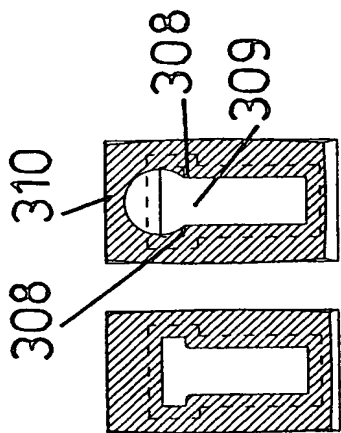


FIG. 27i

Section A-A Section B-B

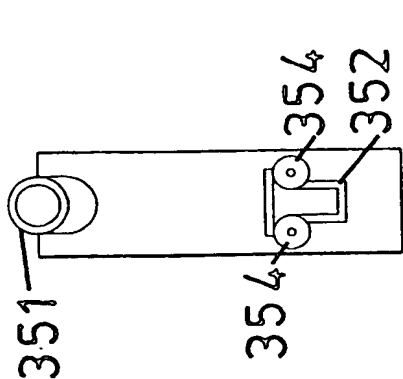


FIG. 28b

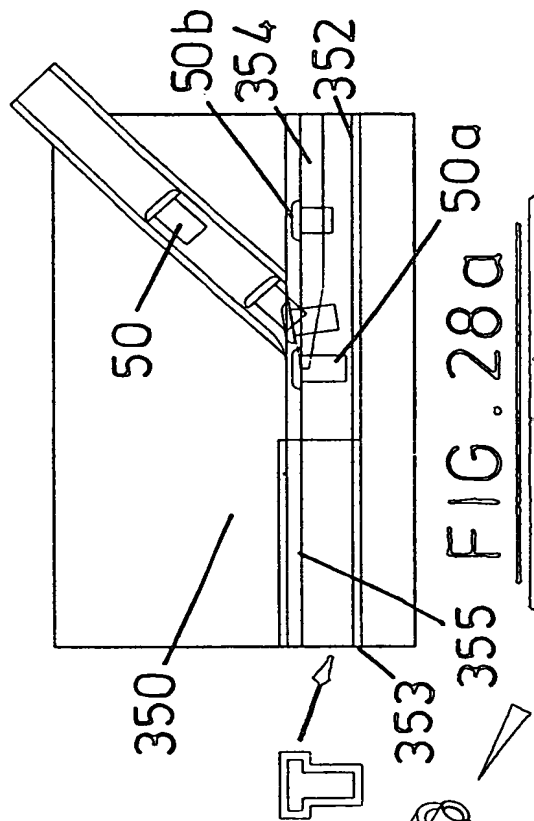


FIG. 28a

31-57

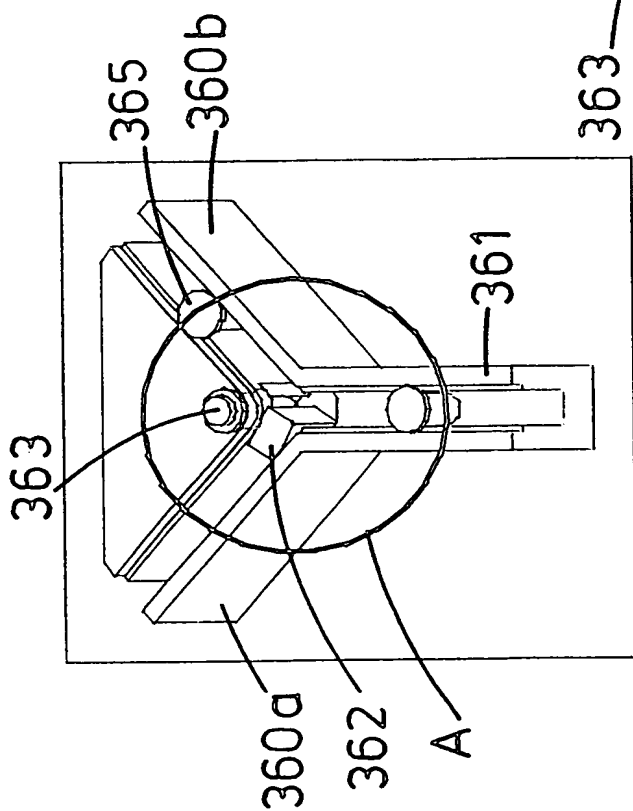


FIG. 29

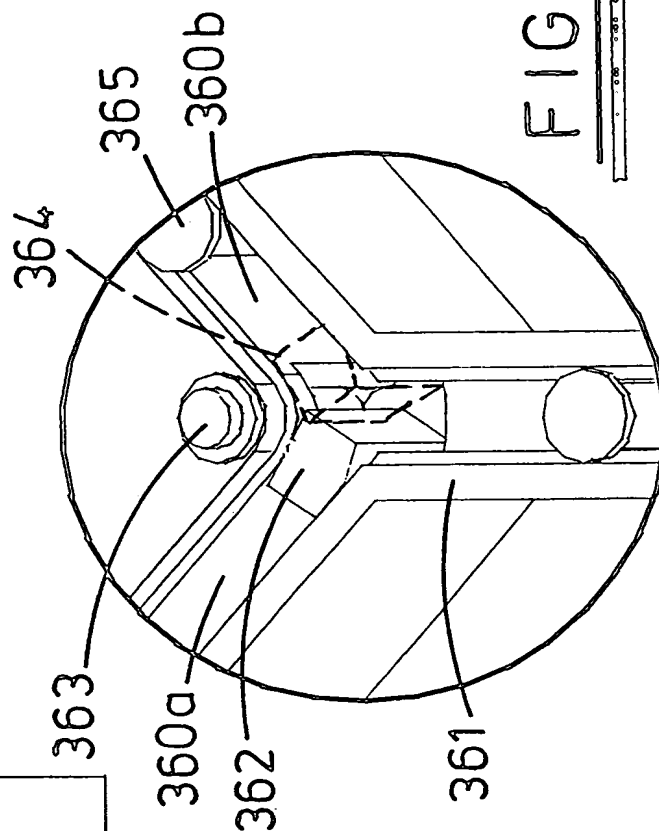
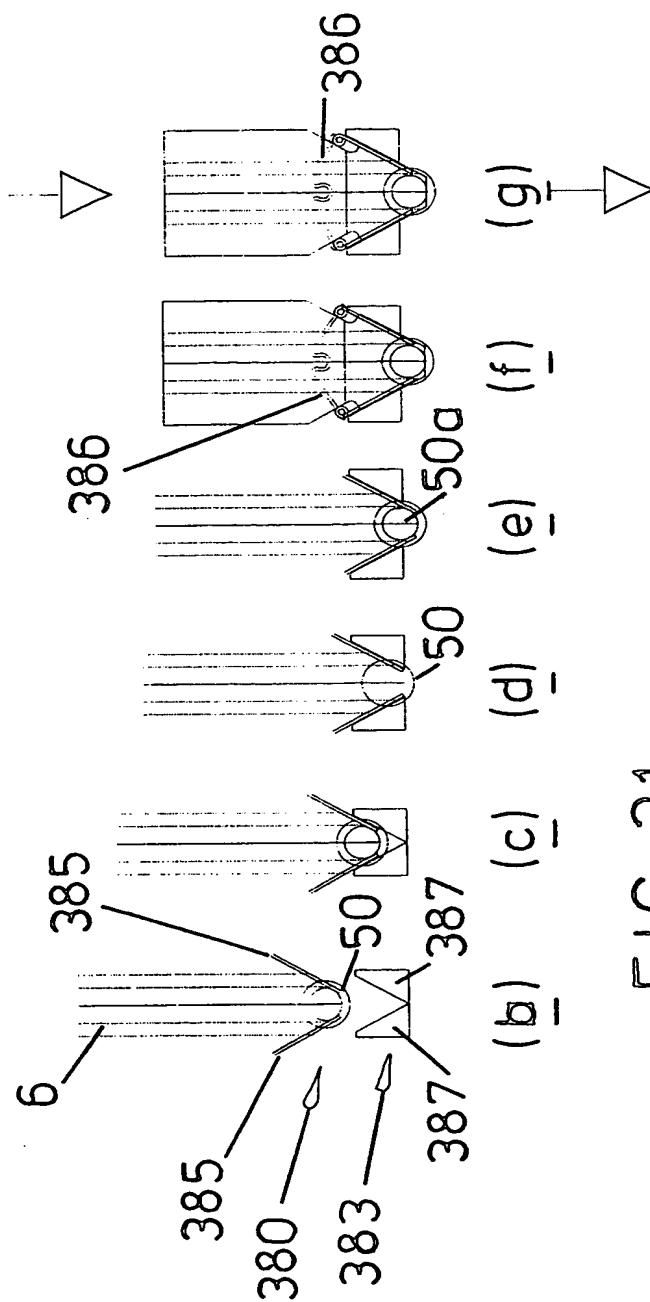
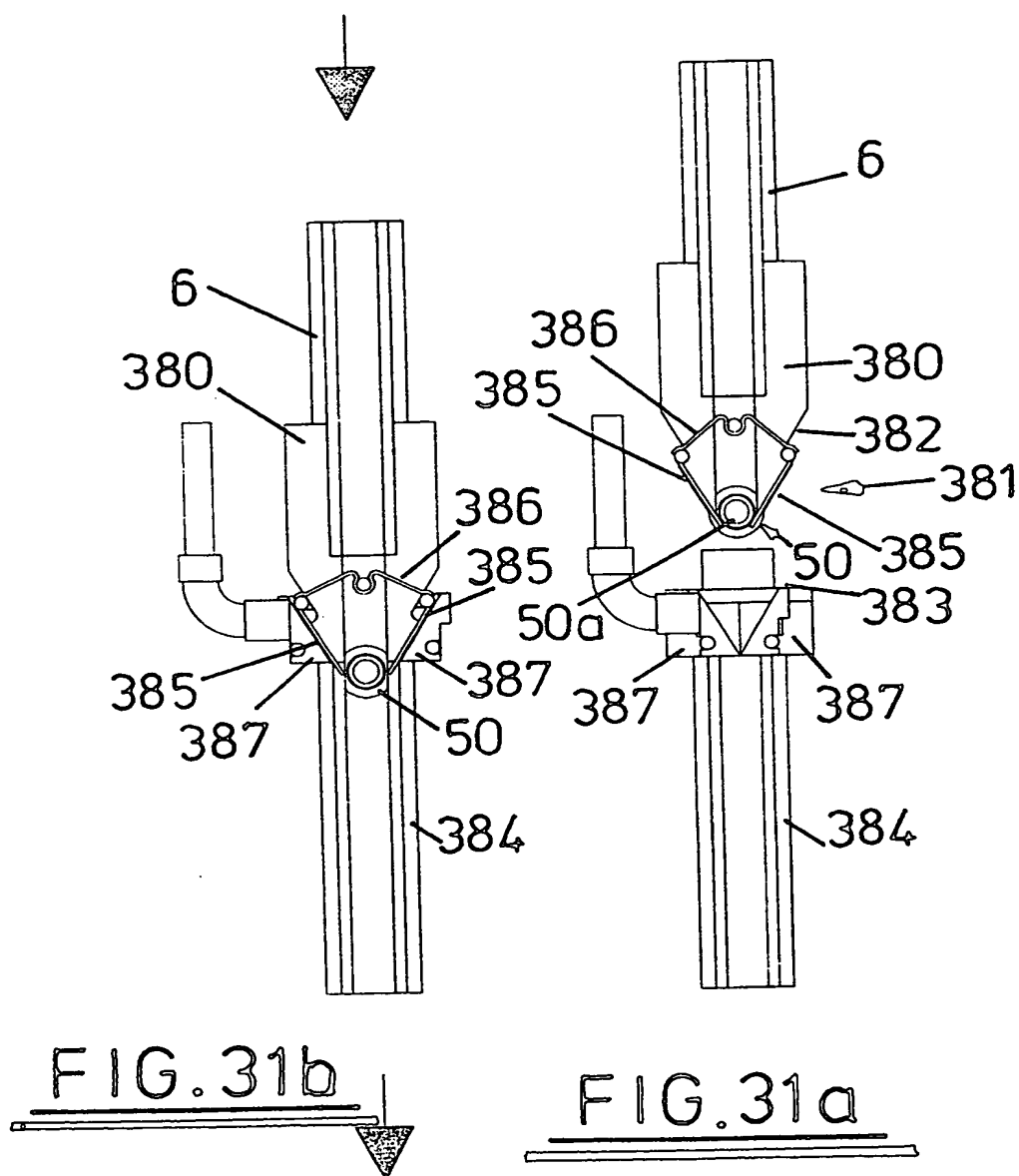


FIG. 30

32.57



33-57



3457

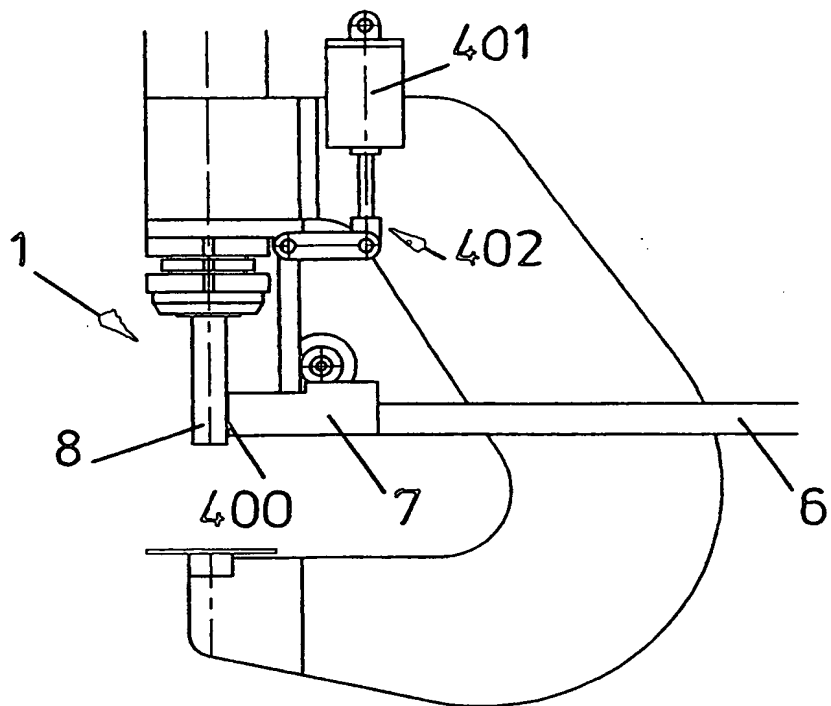


FIG. 32

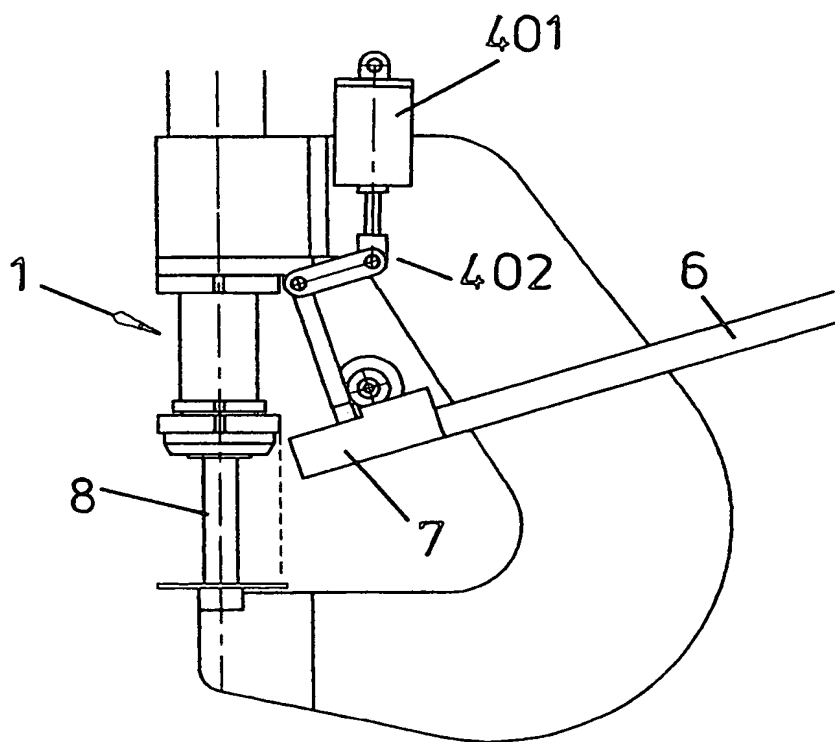


FIG. 33

35-57

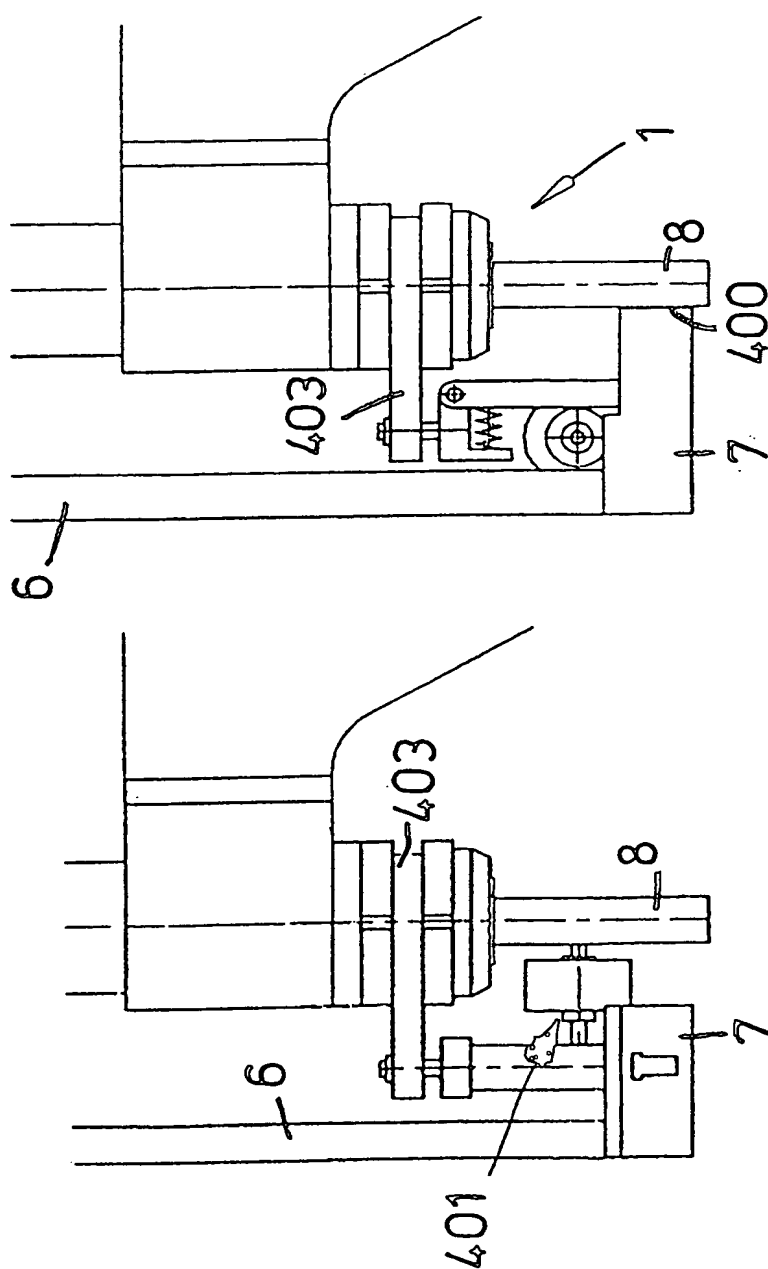
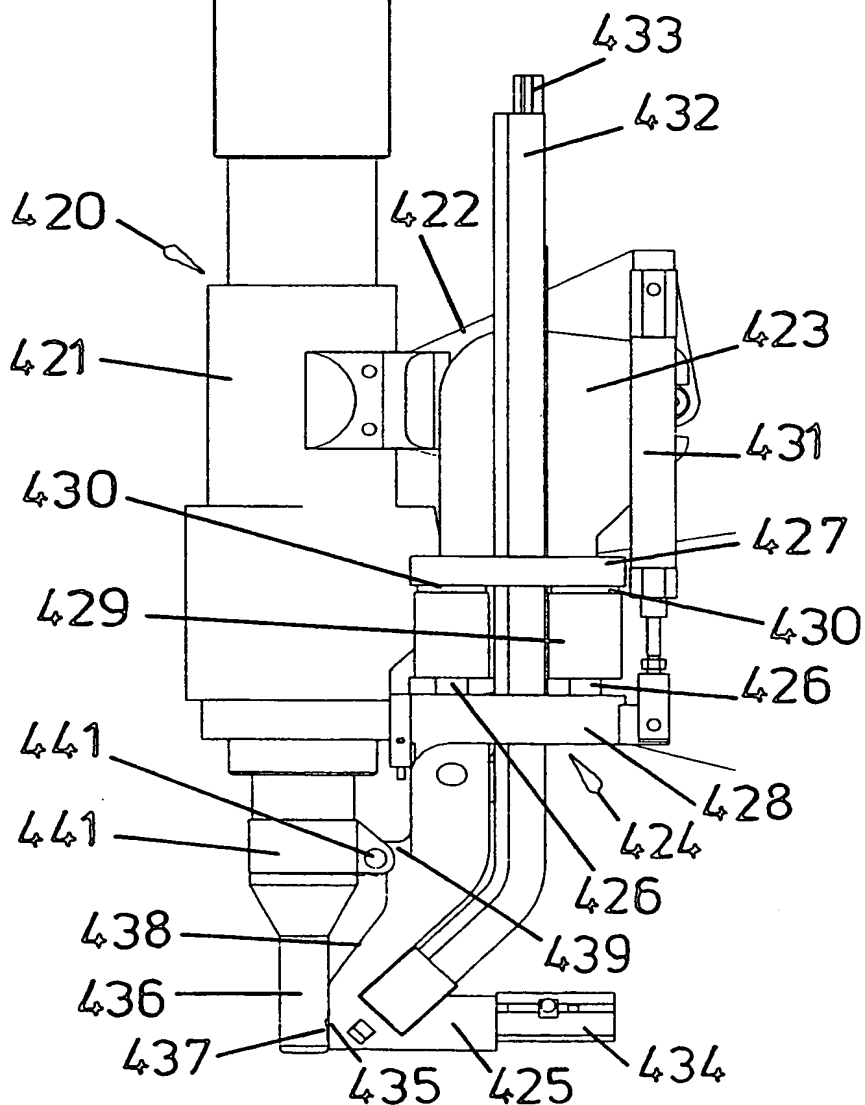


FIG. 34

FIG. 35

36-57

FIG. 36a



37-57

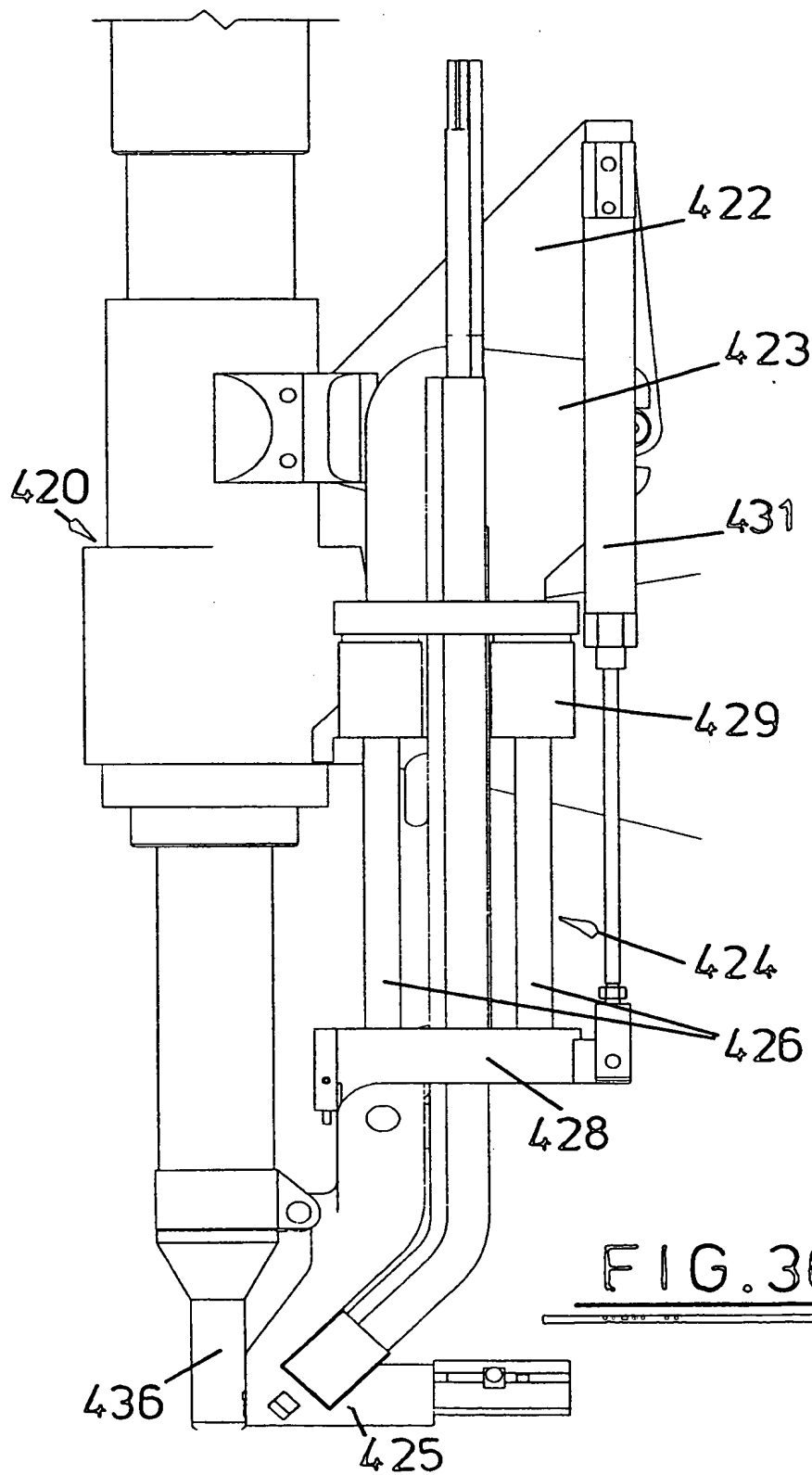


FIG. 36b

38-57

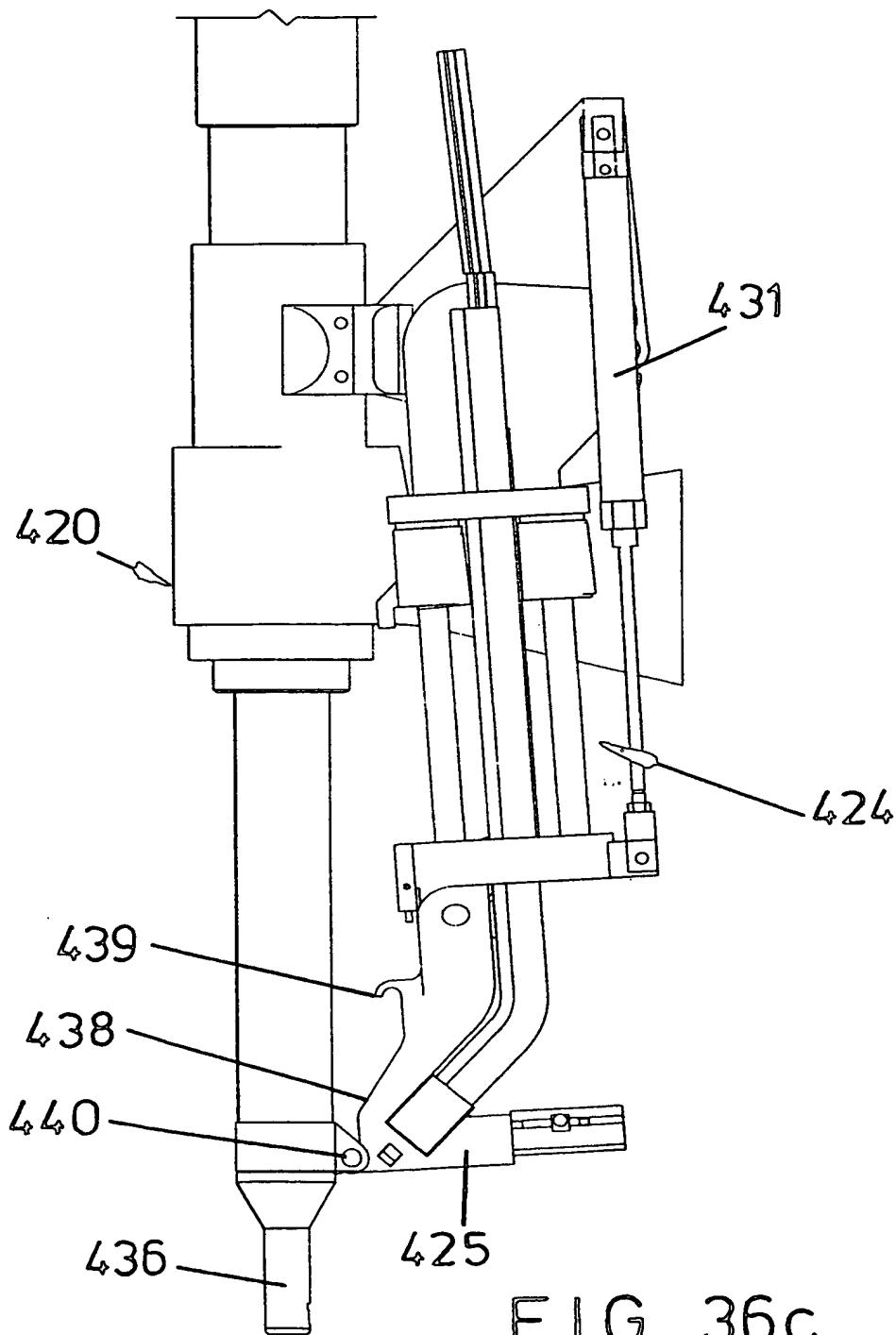
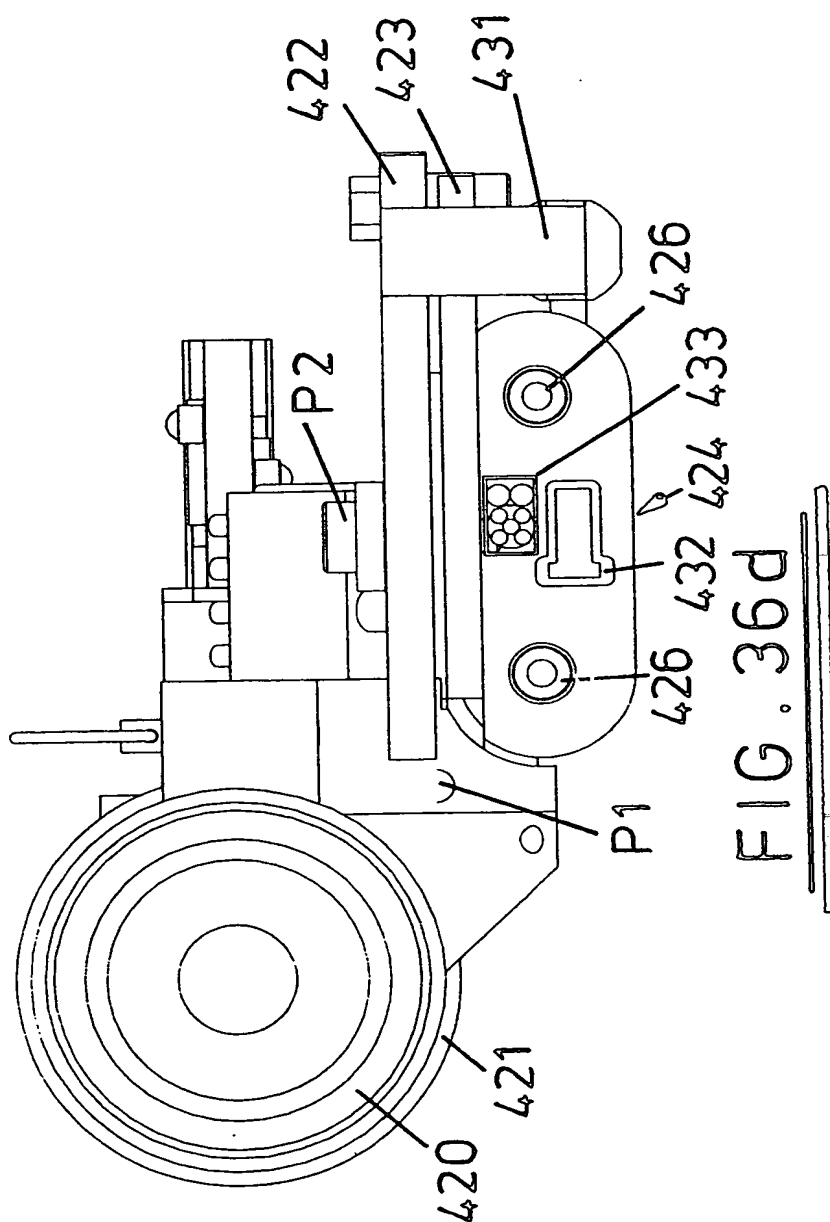


FIG. 36c

39.57



40-57

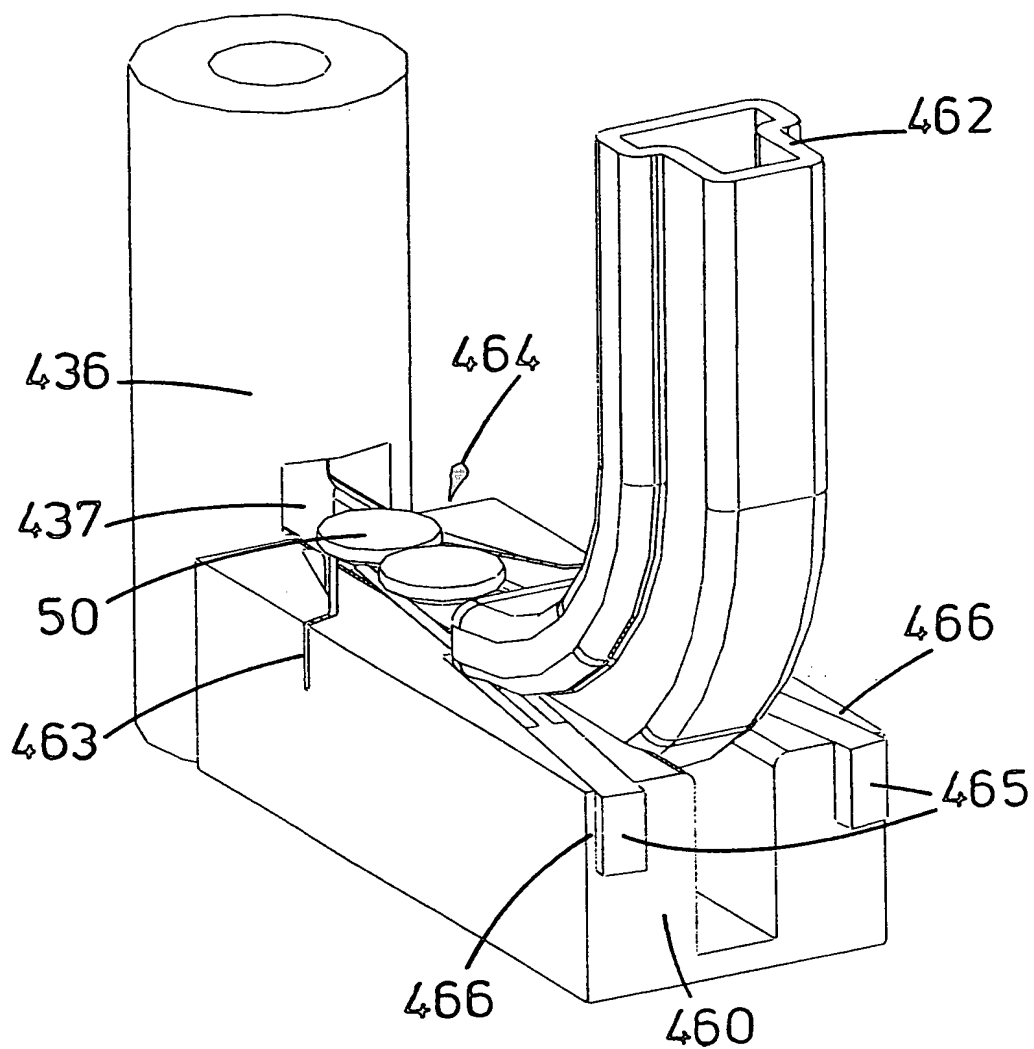


FIG. 37a

41-57

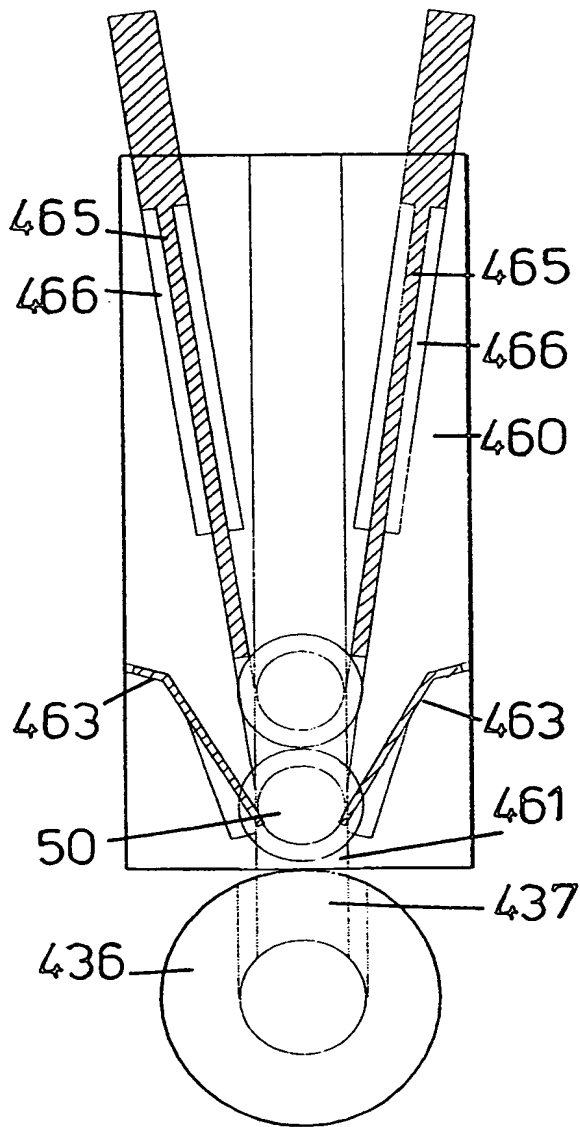


FIG. 37b

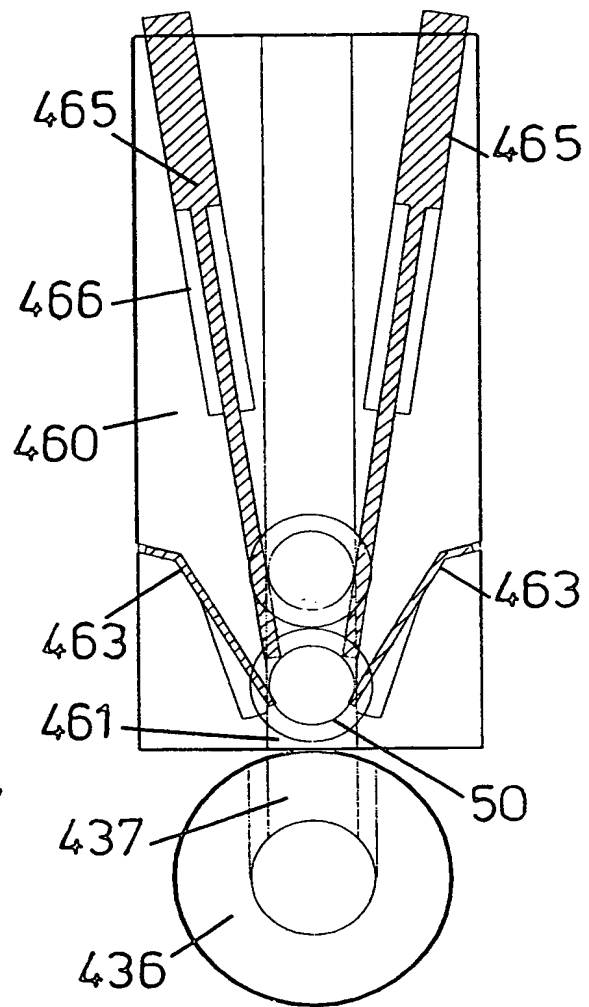


FIG. 37c

42.57

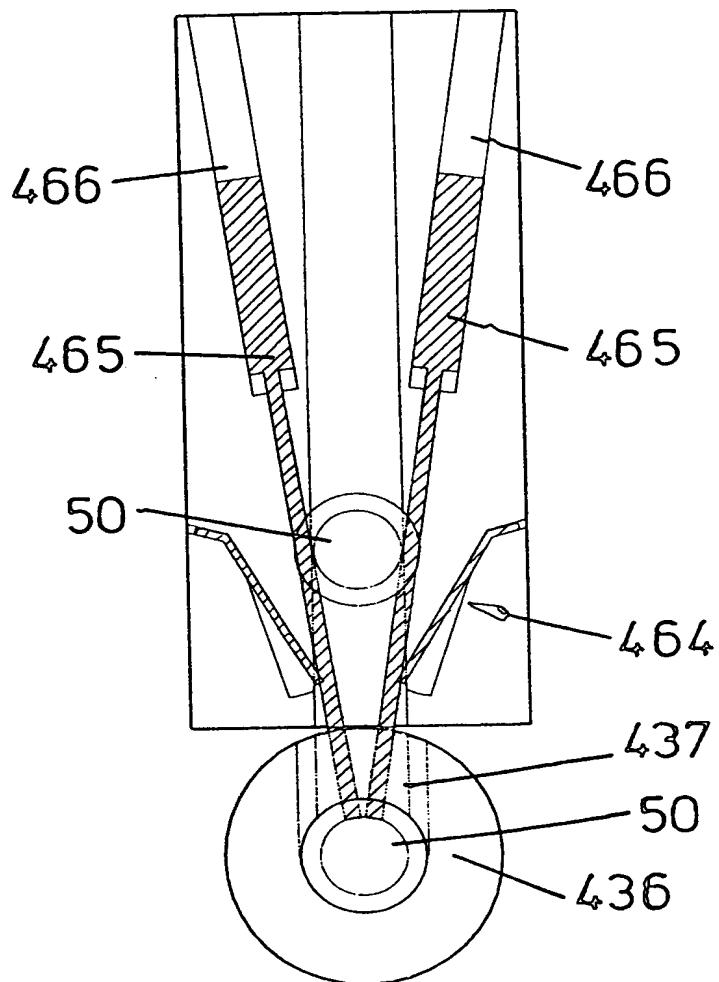
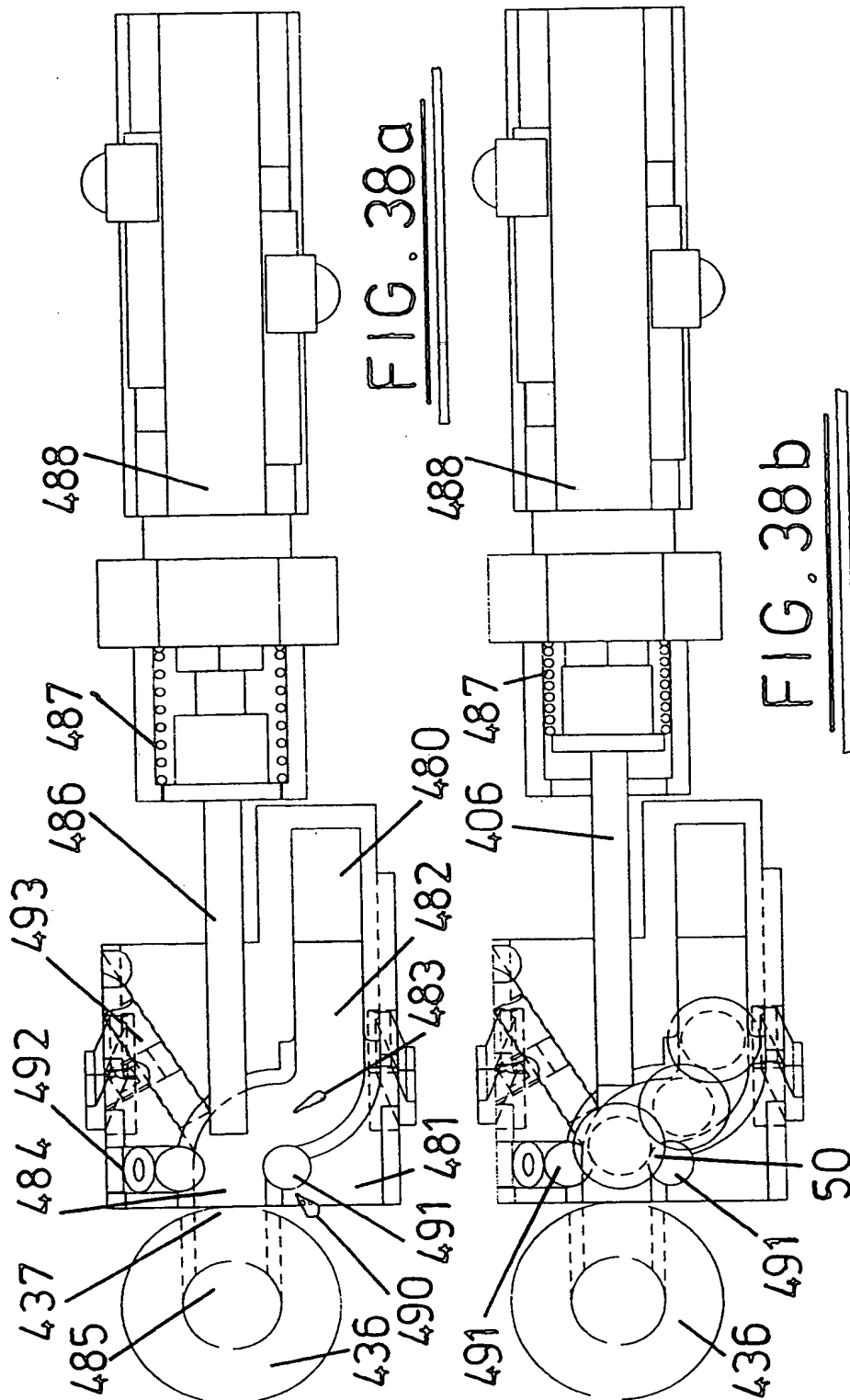
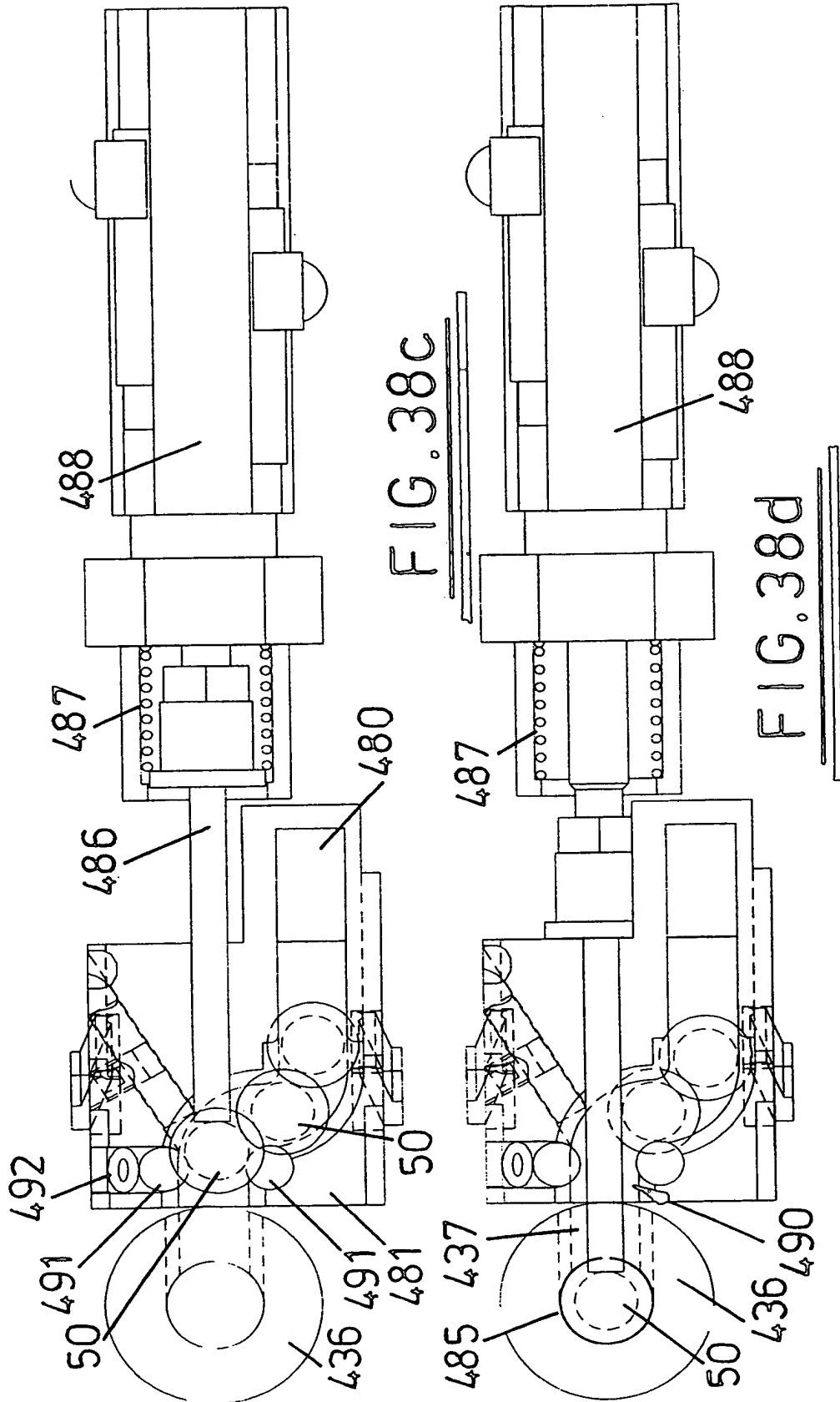


FIG. 37d

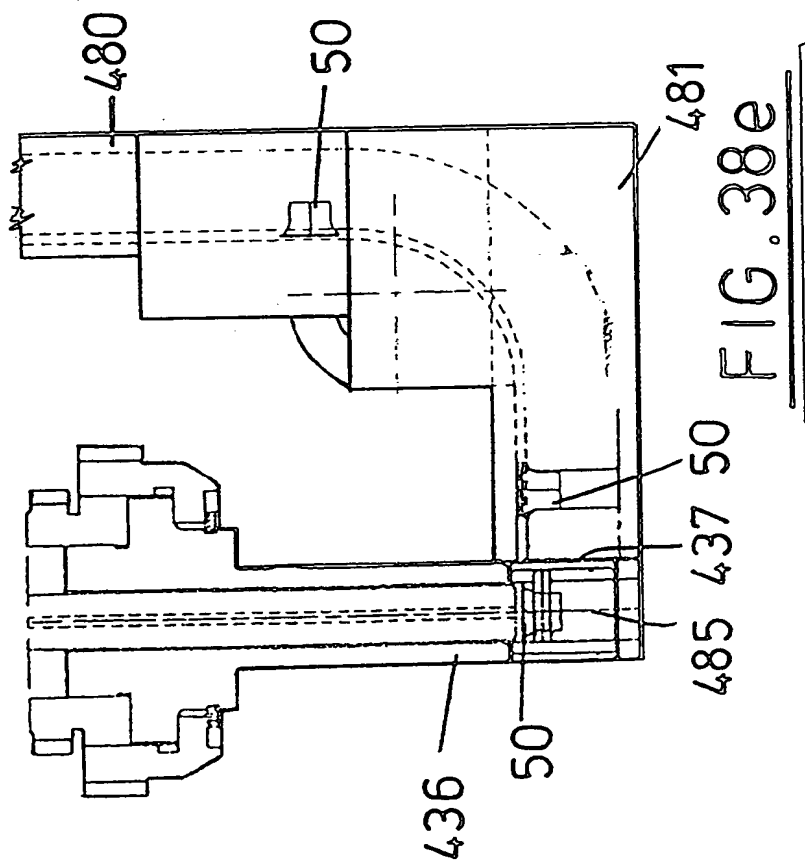
43-57



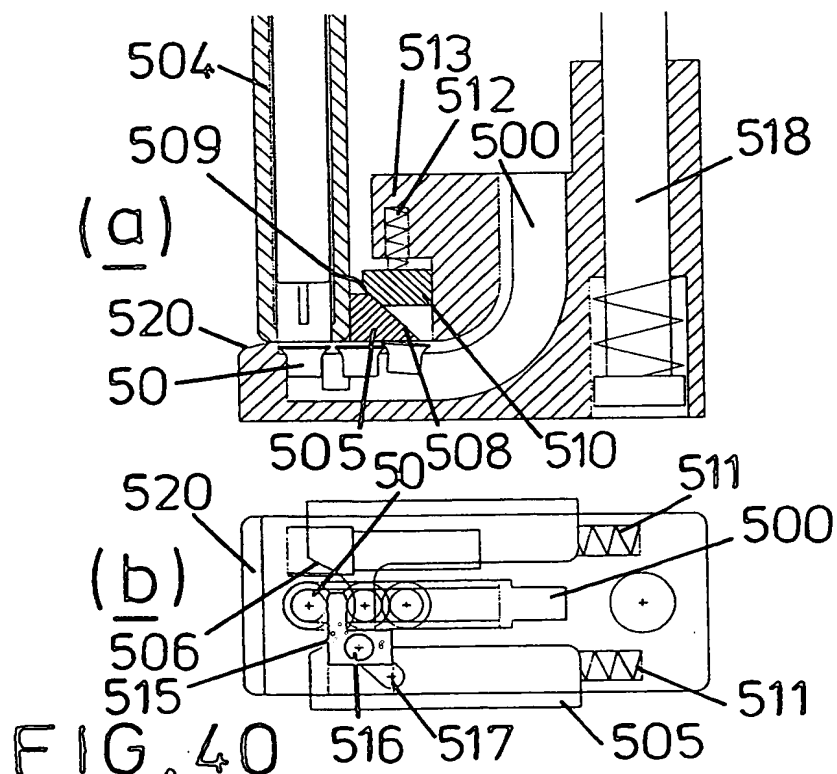
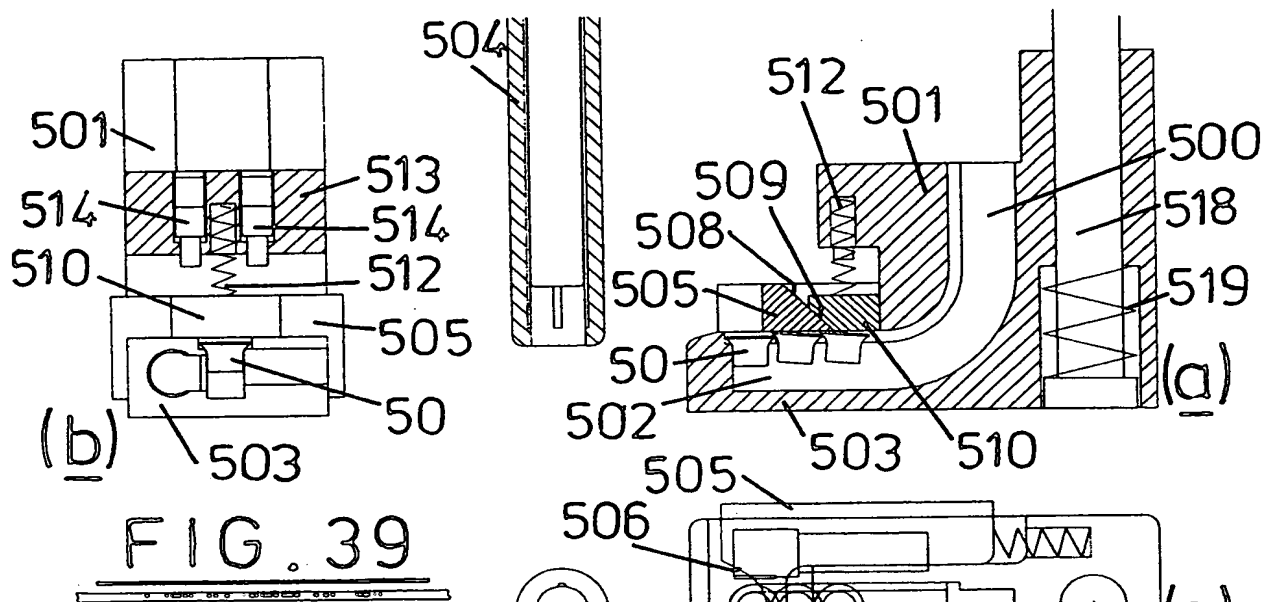
44-57



4557



46-57



47-57

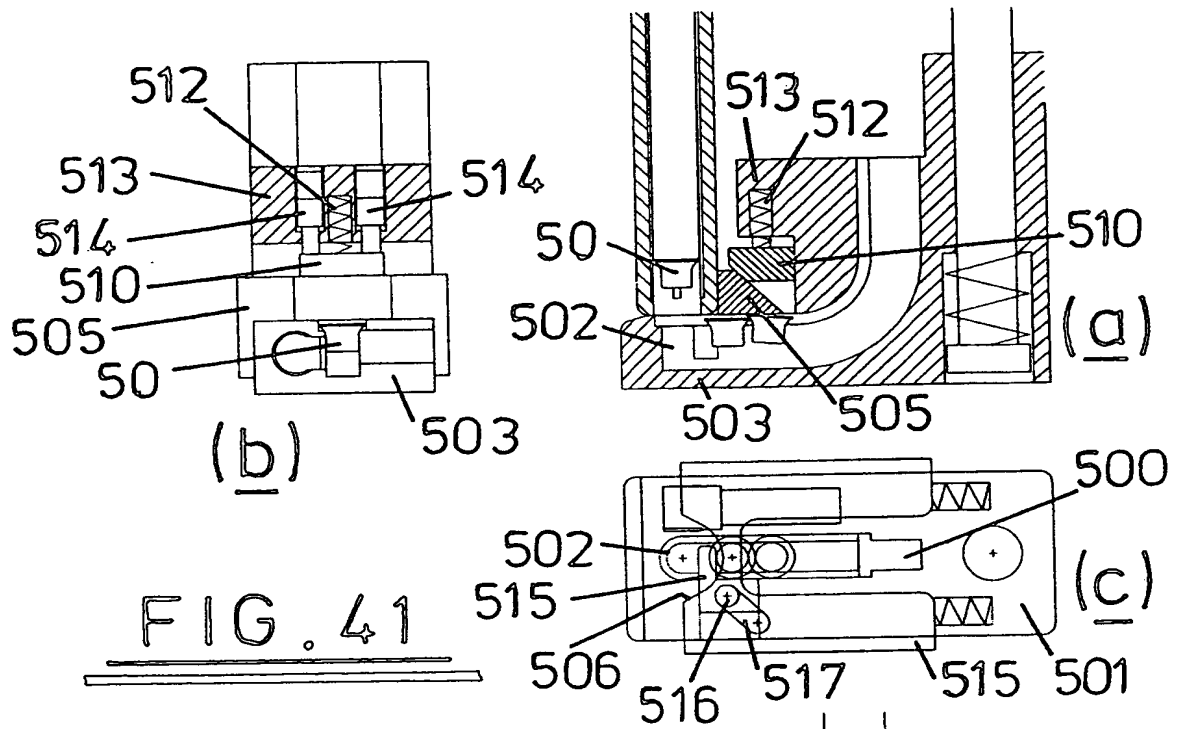


FIG. 41

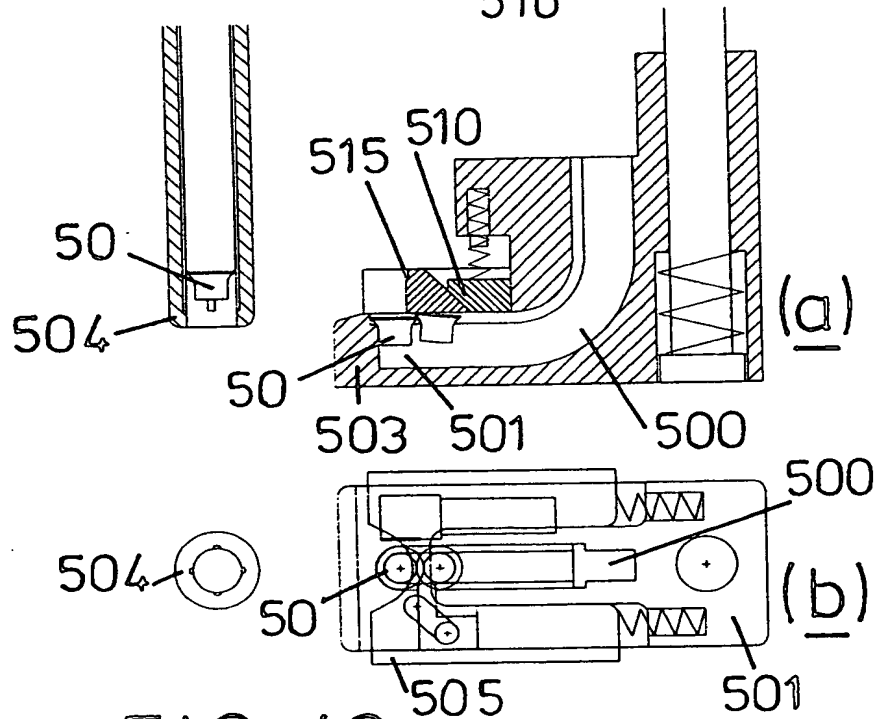


FIG. 42

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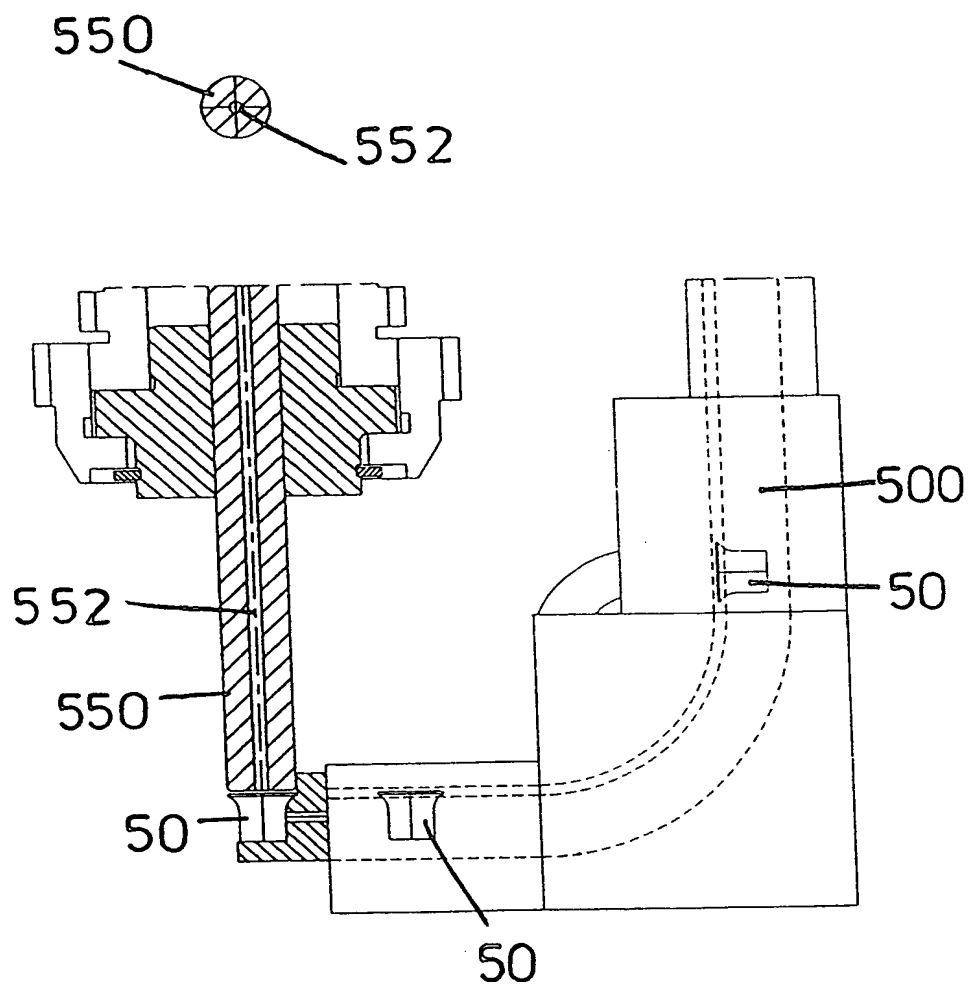
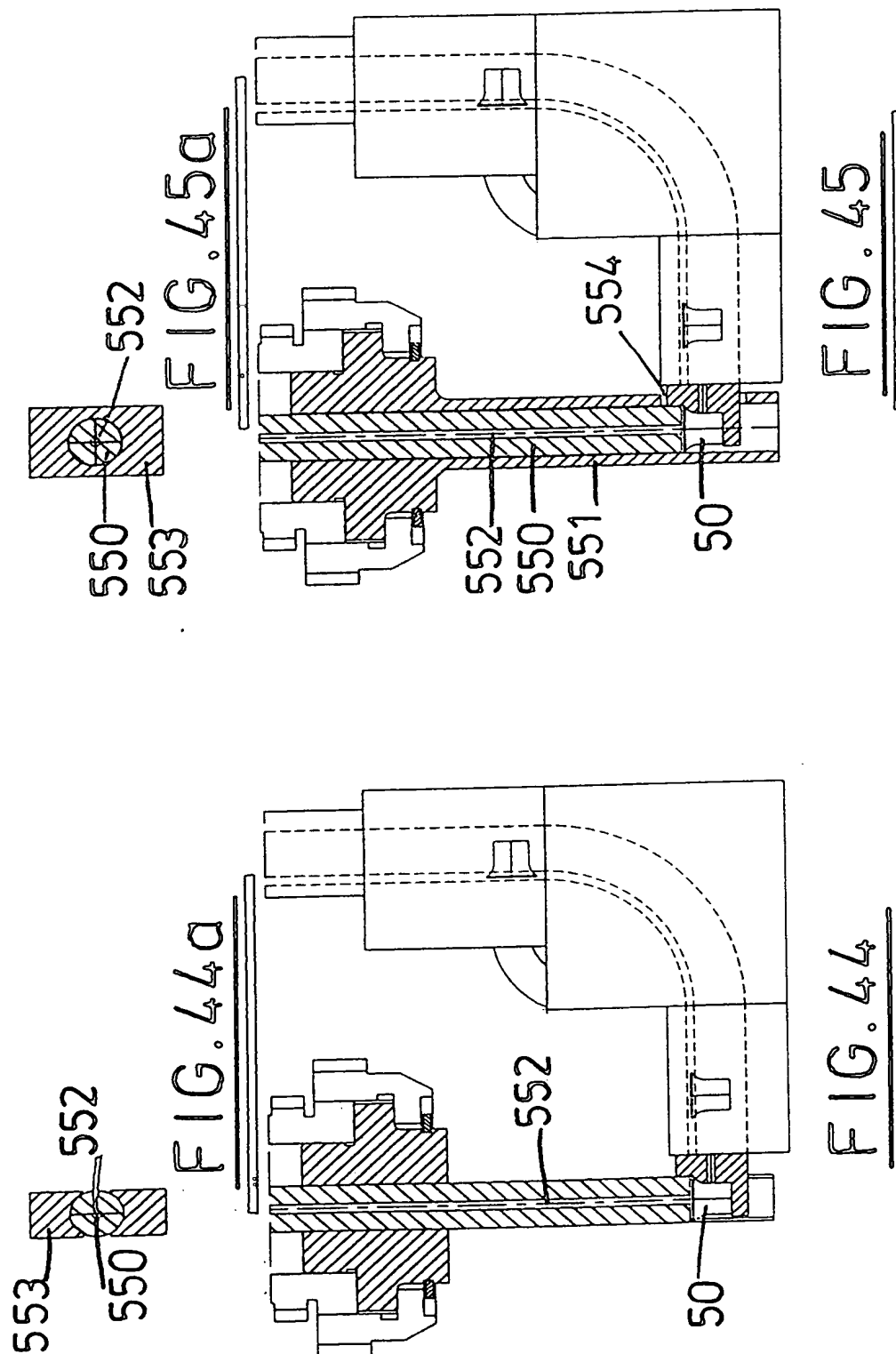
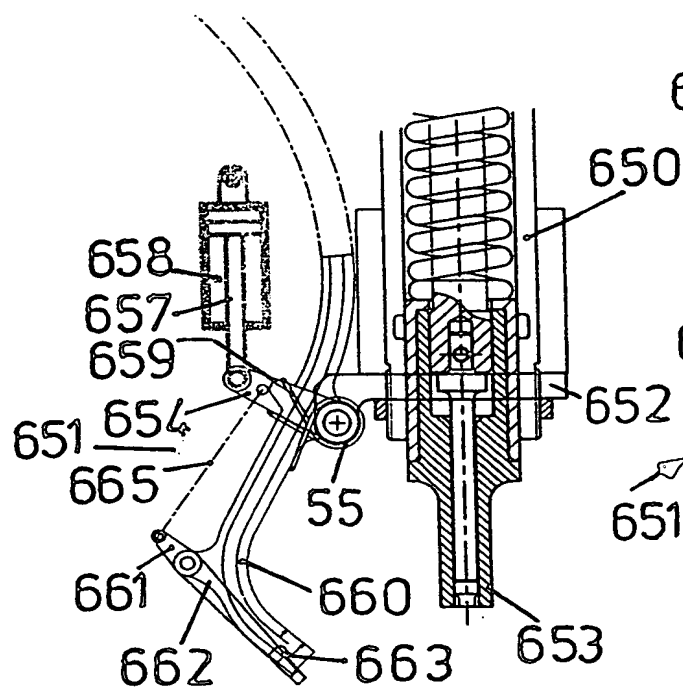
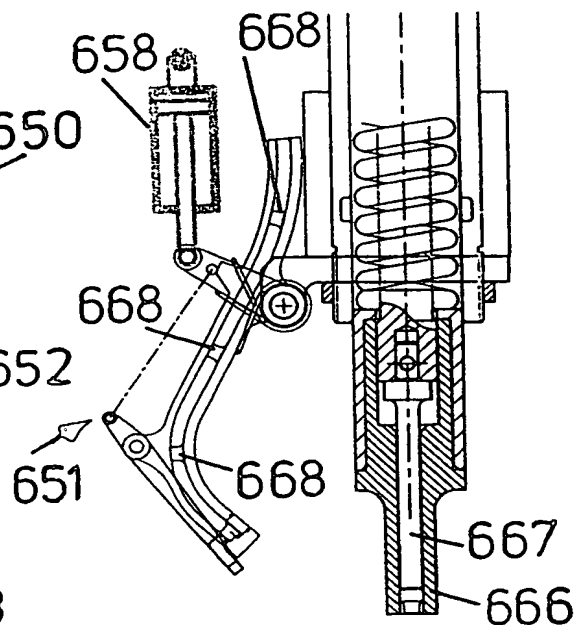
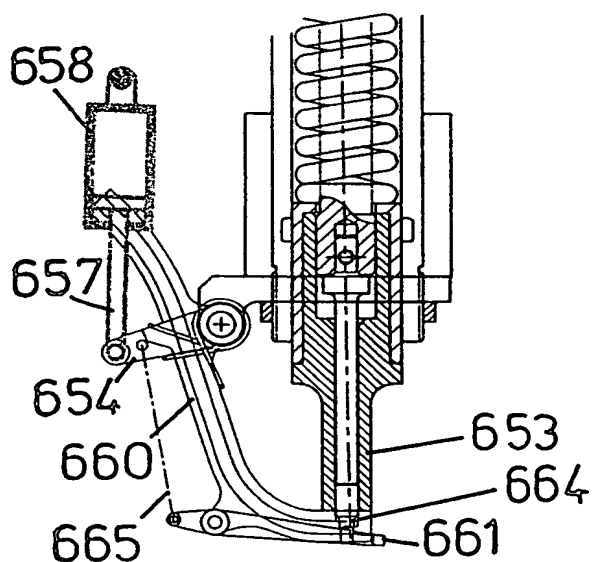
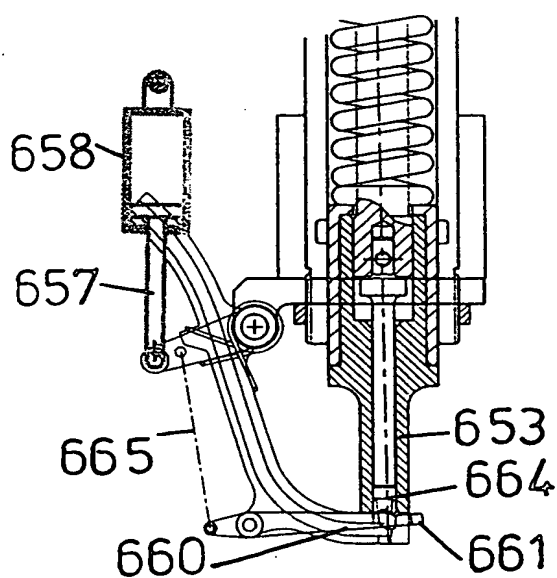


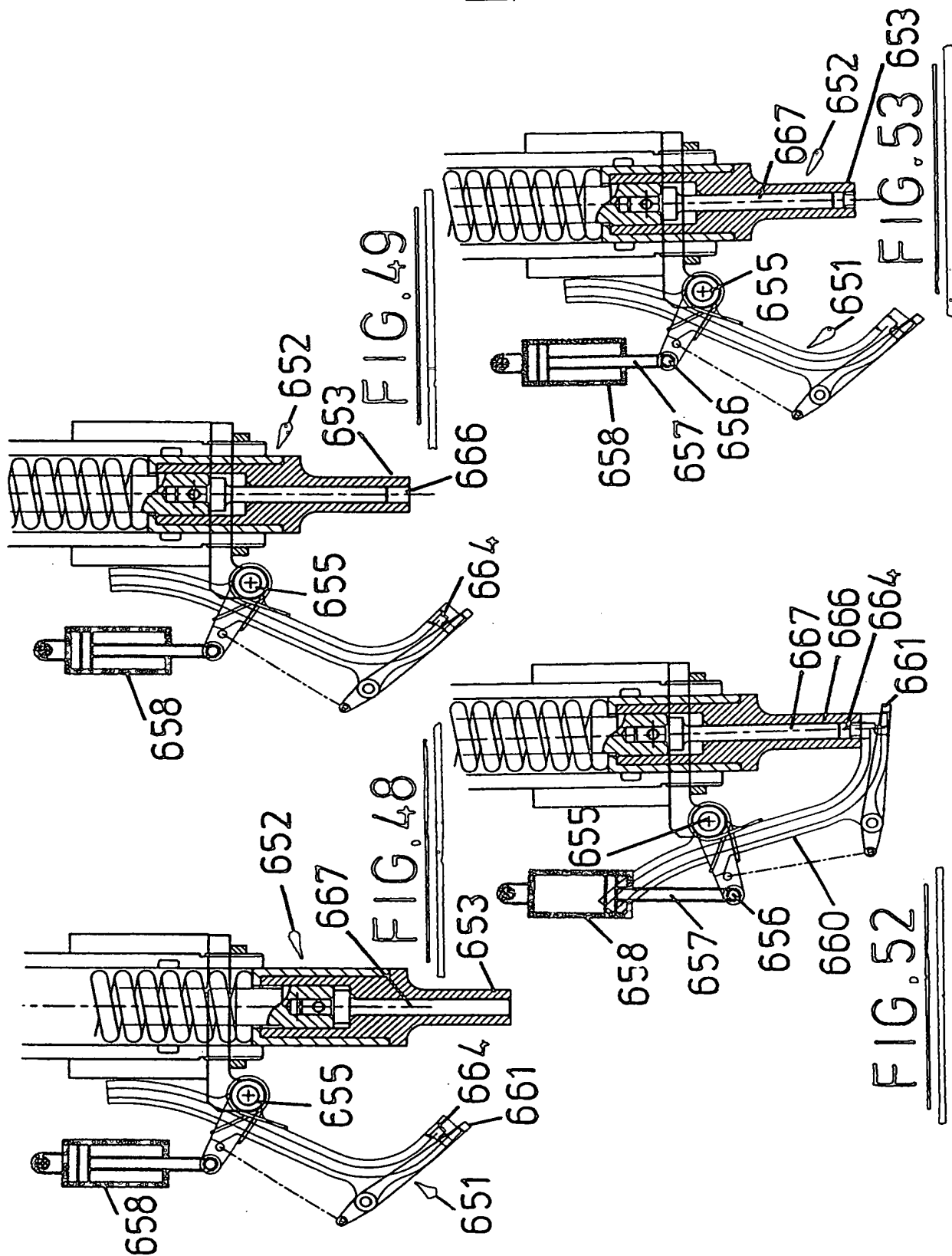
FIG. 43

4957

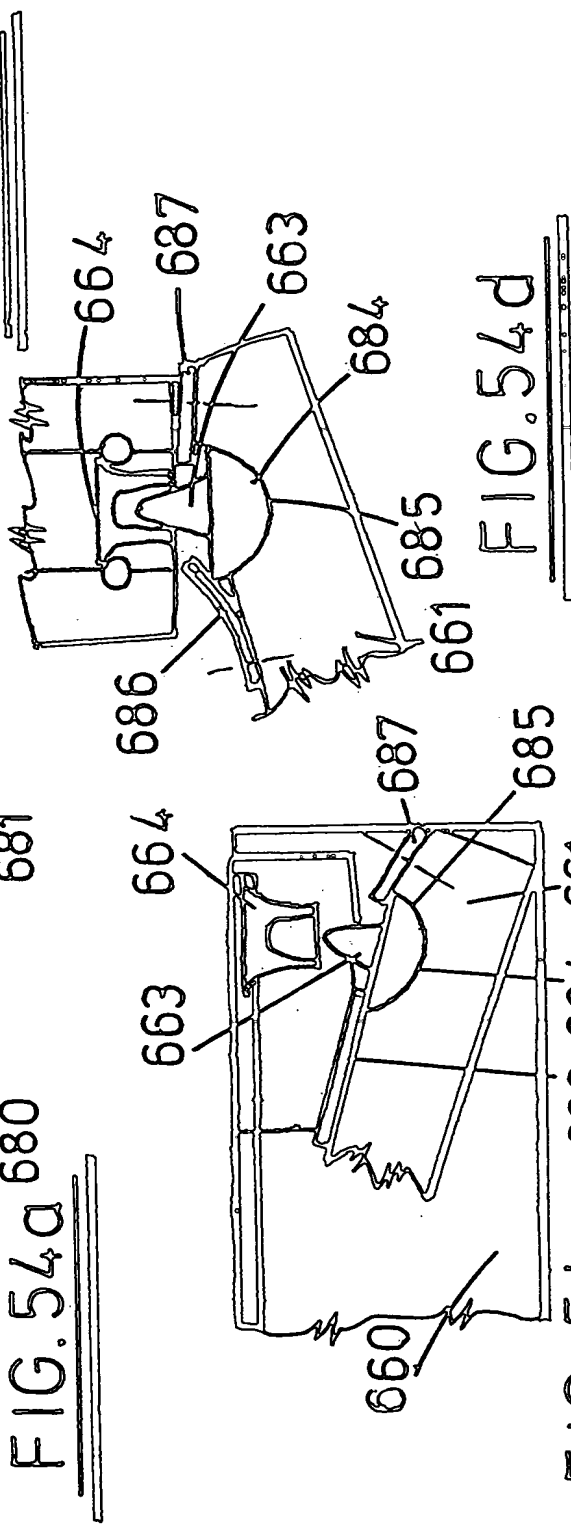
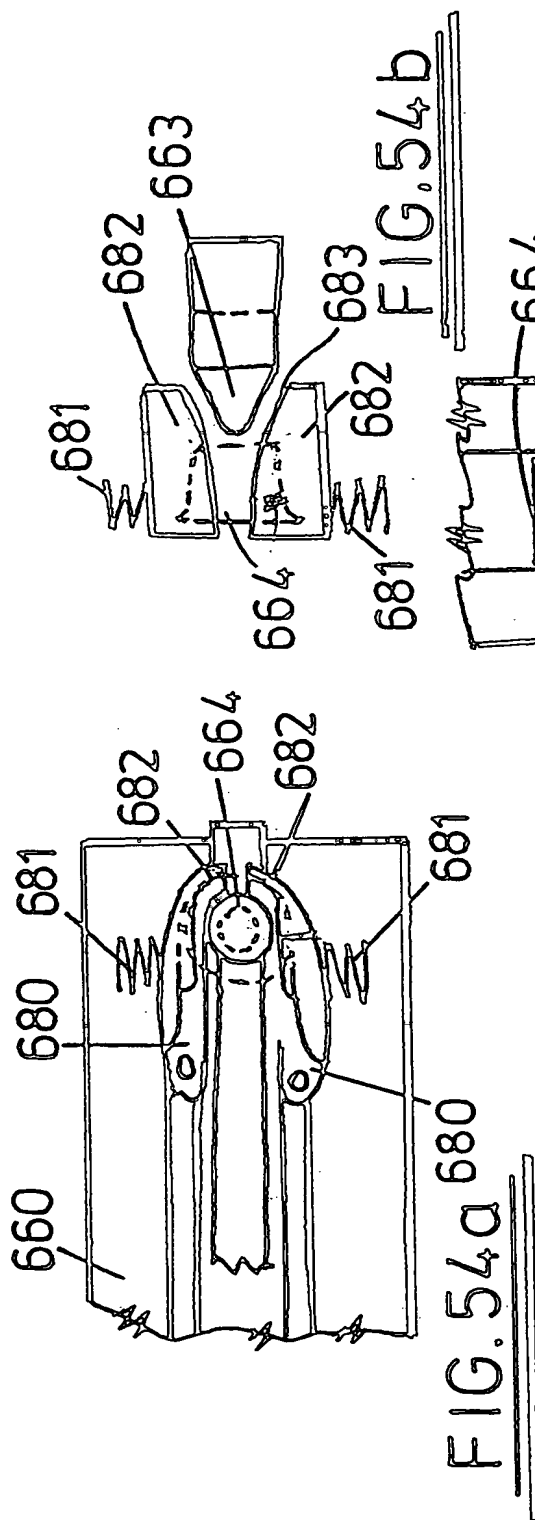


50-57FIG. 46FIG. 47FIG. 50FIG. 51

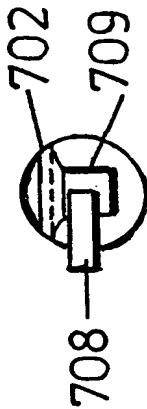
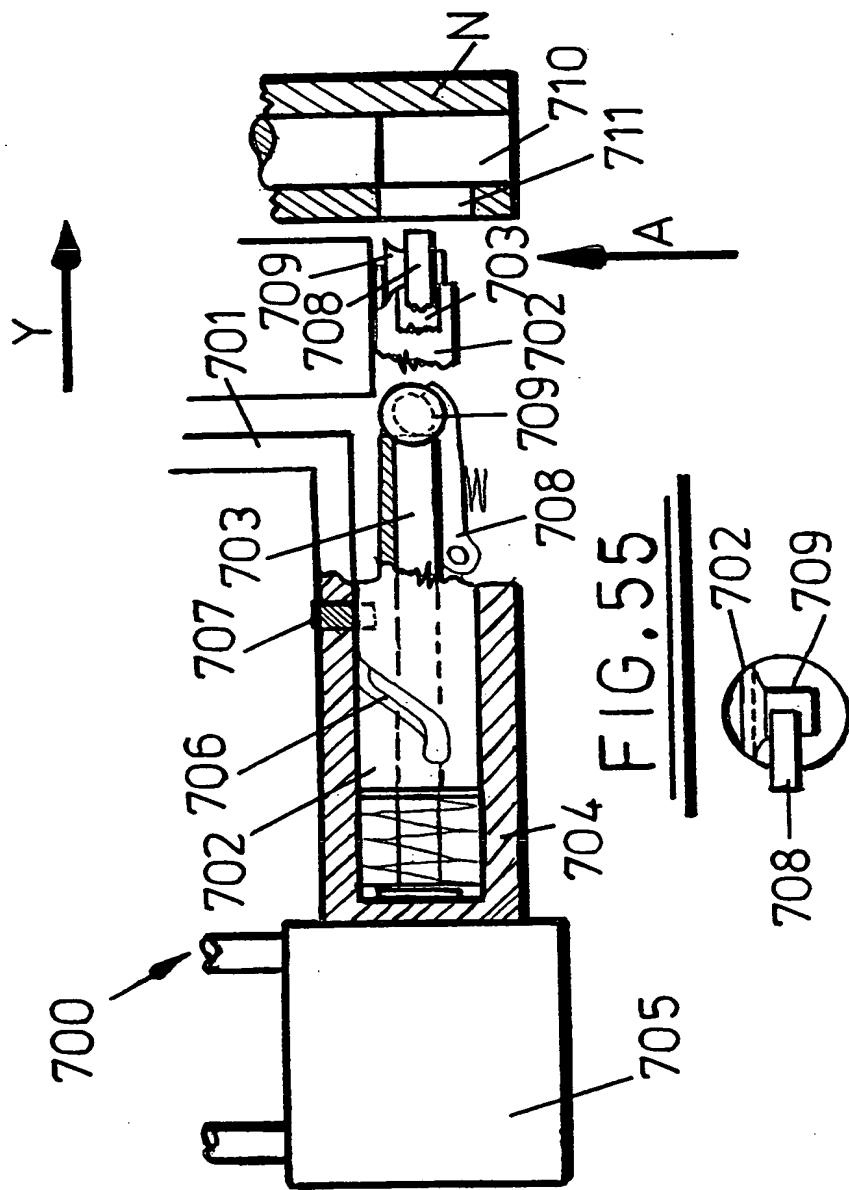
51-57



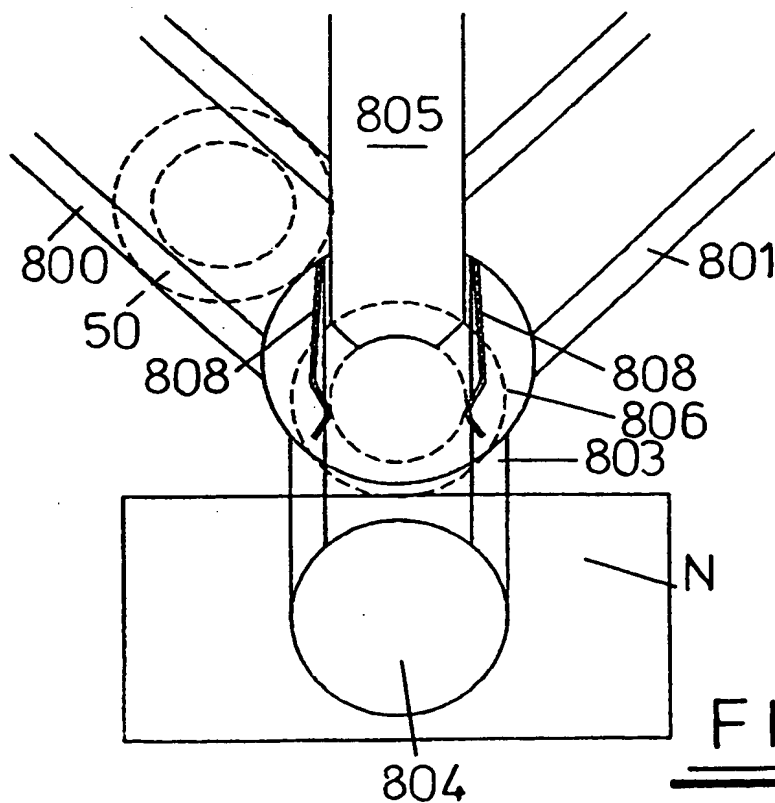
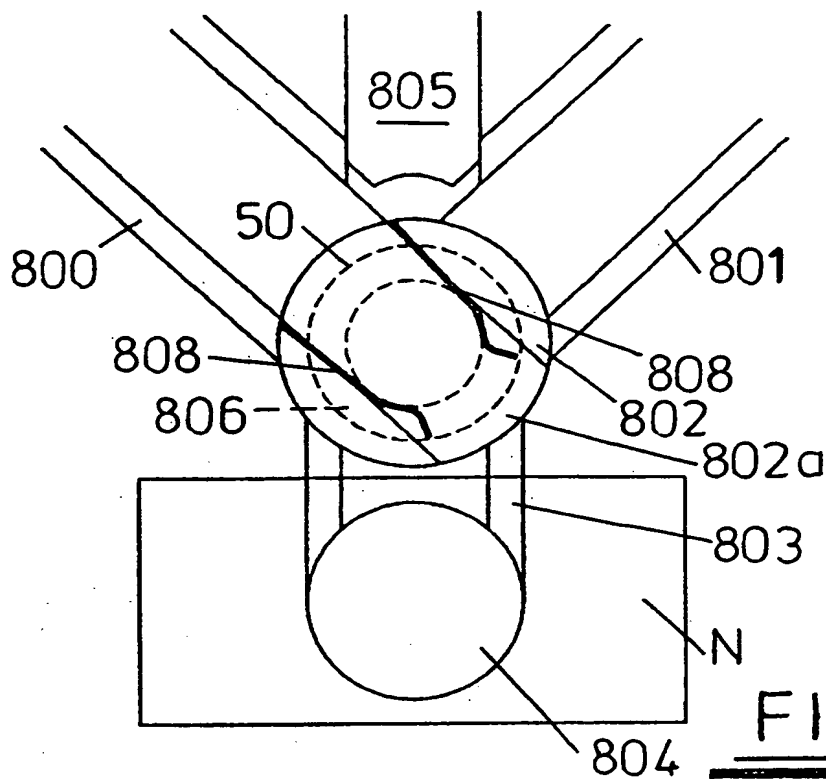
52-57



5-57



54-57



55-57

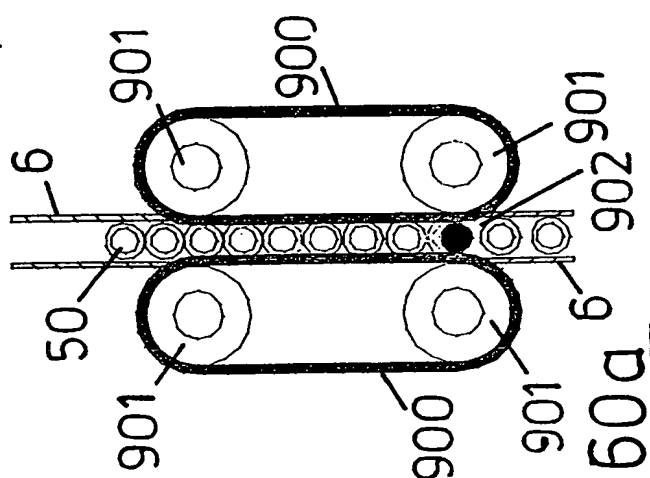


FIG. 59a

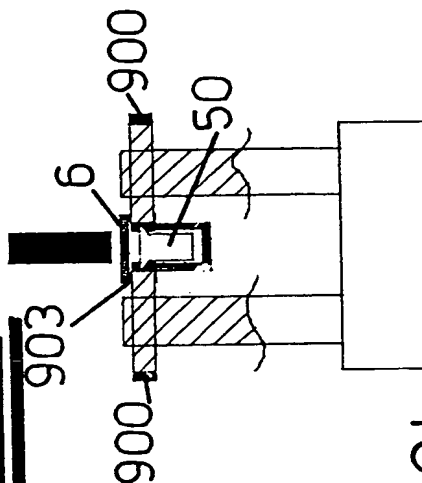


FIG. 59b

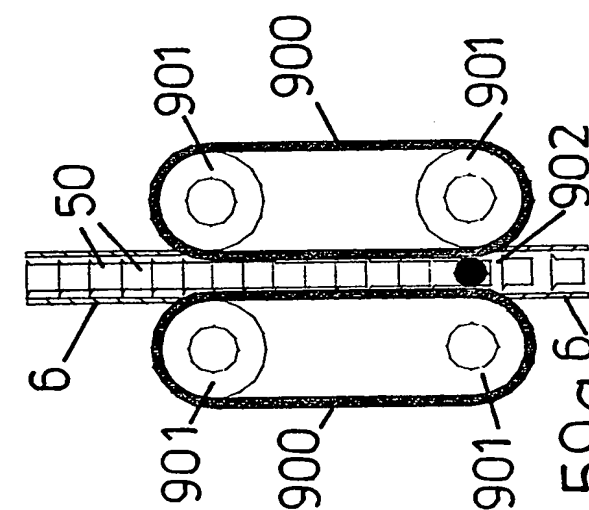


FIG. 60a

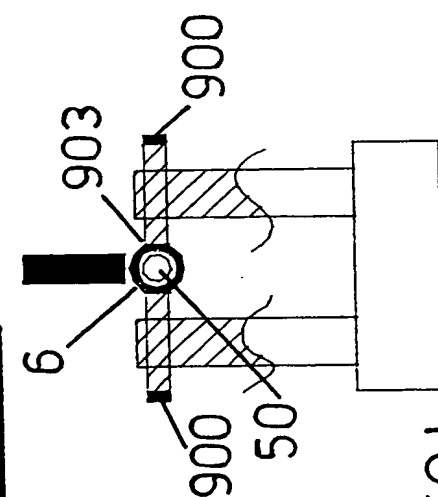
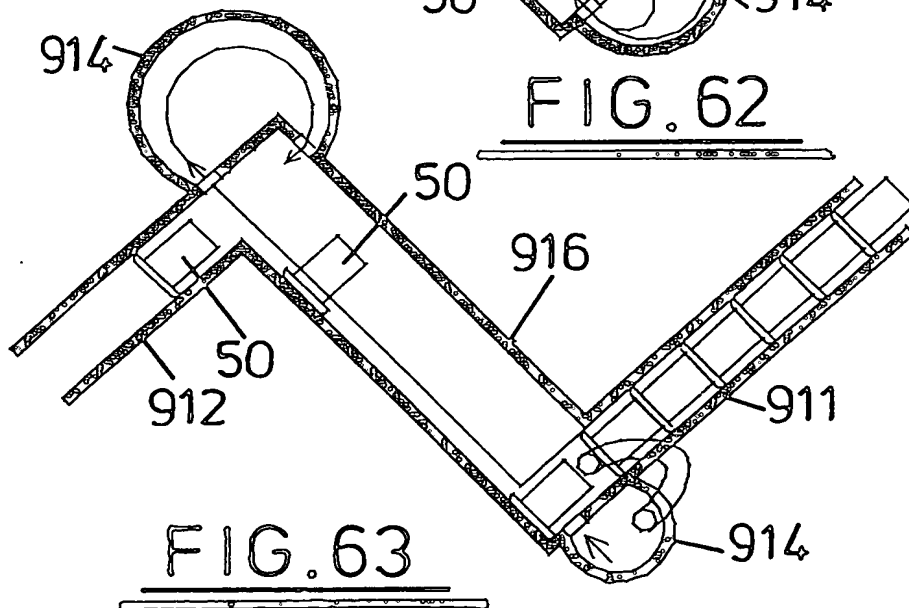
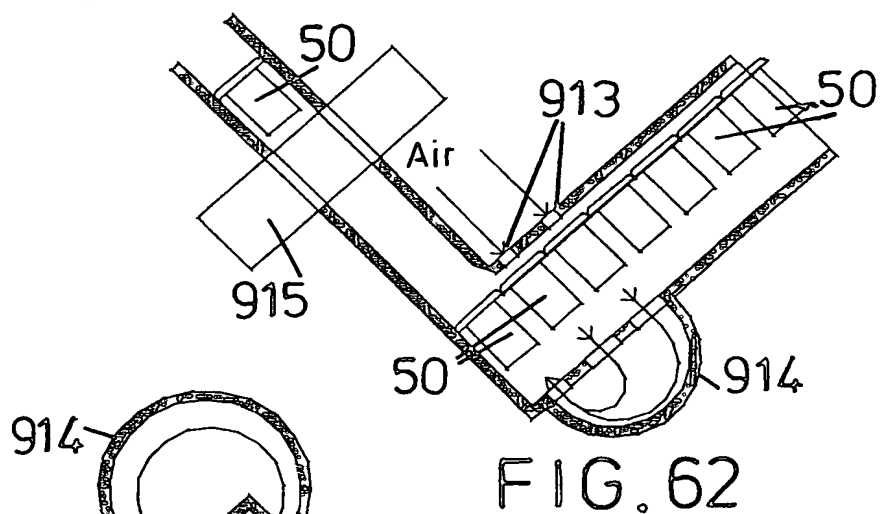
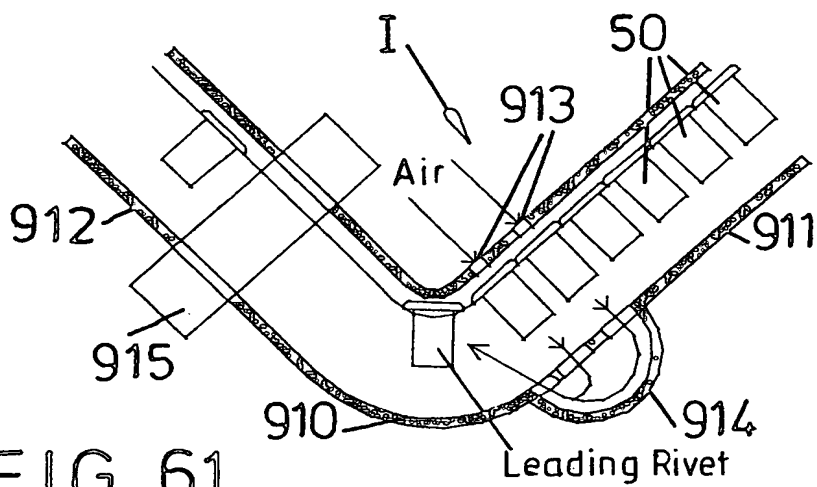


FIG. 60b

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57:57

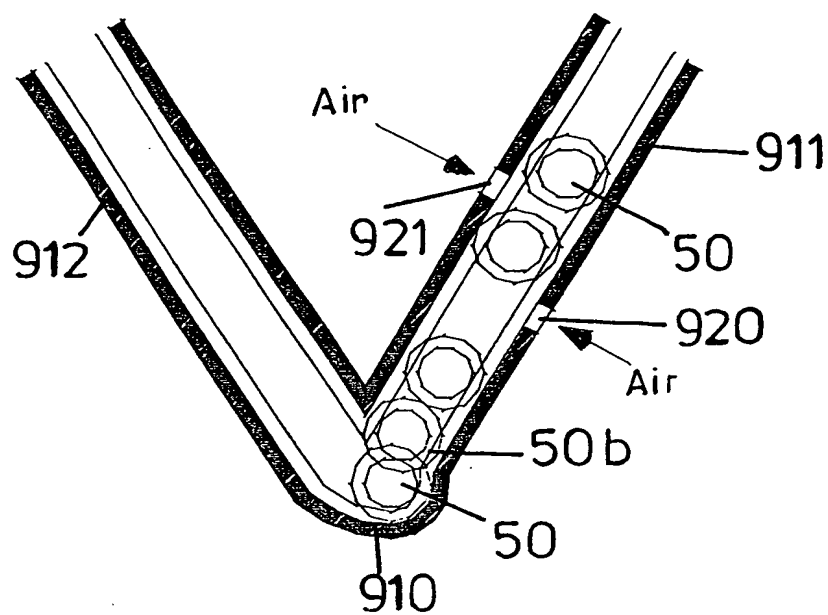


FIG. 64

# INTERNATIONAL SEARCH REPORT

International Application No

PCT/GB 99/02545

**A. CLASSIFICATION OF SUBJECT MATTER**  
IPC 7 B21J15/32

According to International Patent Classification (IPC) or to both national classification and IPC

**B. FIELDS SEARCHED**

Minimum documentation searched (classification system followed by classification symbols)  
IPC 7 B21J

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

Category	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 2 493 868 A (GRIFFIN) 10 January 1950 (1950-01-10) column 3, line 16 -column 5, line 51; figures	1,2,8,9  14-16, 32,48,58
A	---	
Y	US 4 044 462 A (ANSELMO DARIO) 30 August 1977 (1977-08-30) column 2, line 60 -column 3, line 54; figures	1,8-10, 14,15,19
Y	---	
Y	US 5 472 087 A (RINK PHILIP A ET AL) 5 December 1995 (1995-12-05) column 3, line 5 - line 29	1,8-10, 14,15,19 32,35, 48,58
A		
X	column 3, line 46 - line 53 column 4, line 16 - line 44; figures	52-54,56
	---	
	-/--	



Further documents are listed in the continuation of box C.



Patent family members are listed in annex.

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- "&" document member of the same patent family

Date of the actual completion of the international search

15 December 1999

Date of mailing of the international search report

22/12/1999

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# INTERNATIONAL SEARCH REPORT

International Application No

PCT/GB 99/02545

## C. (Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	GB 2 300 183 A (EMHART INC) 30 October 1996 (1996-10-30)	64, 65, 71
A	page 6, line 20 - page 8, line 9; figures	27, 37, 72, 73
A	DE 297 19 744 U (EMHART INC) 26 February 1998 (1998-02-26) page 9, line 14 - line 30 page 11, line 4 - line 16 page 12, line 28 - page 13, line 26; figures	1, 14-17
A	PATENT ABSTRACTS OF JAPAN vol. 005, no. 147 (M-088), 17 September 1981 (1981-09-17) & JP 56 077042 A (PRESS KOGYO KK), 25 June 1981 (1981-06-25) abstract; figures 6, 7	1, 11, 14
A	WO 95 28242 A (BLACKET STUART EDMUND ; GOSTYLLA WOJCIECH (AU); HENROB LTD (GB)) 26 October 1995 (1995-10-26) page 7, line 19 - page 8, line 9; figures 5, 6	72, 73
A	US 5 201 892 A (SALTER JAMES R) 13 April 1993 (1993-04-13) column 3, line 46 - line 61; figures	72

# INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/GB 99/02545

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 2493868 A	10-01-1950	NONE	
US 4044462 A	30-08-1977	NONE	
US 5472087 A	05-12-1995	US 5339598 A US 5193717 A	23-08-1994 16-03-1994
GB 2300183 A	30-10-1996	DE 29507041 U	03-08-1995
DE 29719744 U	26-02-1998	EP 0922538 A JP 11216622 A	16-06-1999 10-08-1999
JP 56077042 A	25-06-1981	JP 1442242 C JP 62045010 B	30-05-1988 24-09-1987
WO 9528242 A	26-10-1995	AU 2248595 A DE 19581624 T GB 2302833 A,B US 5779127 A	10-11-1995 27-03-1997 05-02-1997 14-07-1998
US 5201892 A	13-04-1993	NONE	